

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. XI

MAY-JUNE, 1922

No. 2

ENTRIES 887-2065

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 1075, 1186, 1286, 1287, 1295, 1394, 1438, 1501, 1568, 1607, 1704, 1736, 1809, 1961)

887. ANONYMOUS. Coffee (*Coffea arabica* and commercial varieties) in Guatemala and Costa Rica. Kew Bull. 1921: 346-347. 1921.—This contains notes on coffee culture, pruning, suitable shade trees, and fertilizing.—*E. Mead Wilcox*.

888. ANONYMOUS. Cost of harvesting potatoes. Jour. Ministry Agric. Great Britain 28: 431-435. 1921.—Data secured through questionnaires to farmers covering the cost of digging potatoes by fork, plow, and digger are given. An attempt to establish a "working unit" was found practicable only in the case of the digger.—*Mary R. Burr*.

889. ANONYMOUS. Cotton research in Egypt. [Rev. of: First annual report (1920) of the Cotton Research Board, Ministry of Agriculture, Egypt. Govt. Publ. Office: Cairo.] Nature 108: 30-31. 1921.—This report of the Cotton Research Board, established in May, 1919, includes varieties, selection and breeding, cultural, and entomological investigations. The program of experimental work for 1921 is also outlined.—*Mary R. Burr*.

890. ANONYMOUS. First early potatoes. Jour. Roy. Hort. Soc. 46: 351-352. 1921.—At Wisley, 3 new varieties of first early potatoes were compared with 3 standard varieties. These were grown from local seed and from seed grown at Dumfries; the latter proved superior in every case. There seems to be no doubt that high-yielding qualities are transmissible, but whether this is true for wart disease has not yet been ascertained.—*J. K. Shaw*.

891. ANONYMOUS. Manures for coffee plantations. Kew Bull. 1921: 347-349. 1921.—The value of commercial fertilizers has not been established. Green manure crops and organic manures may have considerable value. A list of the important publications on this subject is appended.—*E. Mead Wilcox*.

892. ANONYMOUS. Mr. Easterby's northern tour. Australian Sugar Jour. 13: 521-522, 529. 1921.—This is a review of the report of the General Superintendent of the Bureau of Sugar Experiment Stations on an official visit to the stations at South Johnstone, Mackay, and Bundaberg, and the sugar districts of Herbert, Johnstone, Cabinda, Cairns, and Mossman.

In the Herbert River district the cane variety, Clark's Seedling, is becoming infested with the "gumming" disease. The Mackay station is distributing a successful variety, Q. 813, which is now being grown commercially. The sugar experiment stations shipped Tablel and Badila to the Farmer's Associations at Macknade and Halifax. This cane is reported as making a remarkable growth in the hot climate of the coast. The principal varieties grown about the Logan and Albert cane districts are Green Seedling D, 1135 and New Guinea 64 or "Purple Top." The latter contains too much glucose to be a first class sugar producer.—*C. Rumbold.*

893. ANONYMOUS. National Institute of Agricultural Botany. *Nature* 108: 258-259. 1 fig. 1921.—This is a brief outline of the organization and work of this institute at Cambridge, England.—*O. A. Stevens.*

894. ANONYMOUS. Second-early potatoes at Wisley, 1920. *Jour. Roy. Hort. Soc.* 46: 390-391. 1921.—The awards in a test of 82 stocks of second early potatoes are listed, and the varieties are classified and briefly described.—*J. K. Shaw.*

895. ANONYMOUS. Seed testing during 1919-1920. Third annual report of the official seed testing station of the Ministry. *Jour. Ministry Agric. Great Britain Suppl.* 20: 3-19. 1921.—This report gives the number of samples of various kinds of seed tested, the percentages of germination, and the kinds of weed seed found.—*Mary R. Burr.*

896. ANONYMOUS. Wagga growing-crop competition. *Agric. Gaz. New South Wales* 32: 843-852. 1921.—Points awarded to 16 leading competitors, varieties used, and methods of cultivation are given.—*L. R. Waldron.*

897. ANONYMOUS. Uba cane in Bundaberg district. *Australian Sugar Jour.* 13: 57. 4 fig. 1922.—This variety can be grown successfully on black or alluvial soils, and stands frost better than most varieties cultivated. Hitherto it has not been regarded with favor in Queensland.—*C. Rumbold.*

898. ANDERSON, T. Plant breeding. *Trans. Highland and Agric. Soc. Scotland* 33: 143-179. 1921.—This is an historical résumé giving the origin of many varieties of cereal, potatoes, and forage plants. Beginning with Le Couteur, Hunter, and Gorrie, who developed "Bellevue de Talavera," "Hunter's White Wheat," and Annat Barley, some of the productions of prominent breeders are noted.—*H. V. Harlan.*

899. ANDREWS, FRANK. Handbook of foreign agricultural statistics. U. S. Dept. Agric. Bull. 357. 69 p. 1921.—This collection of official statistics of foreign countries and island possessions of the U. S. A. includes number of live stock, crop acreage, and yields per acre; imports and exports, and tables of equivalents of foreign weights and measures.—*J. T. Buchholz.*

900. APPLEMAN, CHAS. O., EARL S. JOHNSTON, JOHN M. ARTHUR, S. V. EATON, E. V. MILLER, and JOHN PAUL JONES. Plant physiology investigations. *Ann. Rept. Maryland Agric. Exp. Sta.* 32: xlvi-xlviii. 1918/1919.—The non-parasitic character of the spindling sprout disease of potato tubers has been definitely established; much light has been thrown on the cause of the disease by artificially producing it. Some storage studies show that great deterioration in seed value occurs when potatoes are kept in cold storage for a long time after the rest period. Sprout vigor determines the vigor of the potato plant and yield of tubers other conditions being equal. A mathematical expression, which furnishes a safe basis for comparing sprout vigor, has been devised. Growth processes continue in the underground part of the McCormick potato for some time after the vine has been killed by frost. The large tubers then become mother tubers for the growth of very small ones, which normally abort. Potatoes should be dug as soon as possible after a killing frost. A study of fruit buds of peach during winter and spring indicates a seasonal change in the moisture content, and that the hardy variety has a lower moisture content than the less hardy. Moisture determinations may prove to be important indices of hardiness.—*Earl S. Johnston.*

901. ASTON, B. C. Improvement of poor pasture. New Zealand Jour. Agric. 23: 20-24. 1921.—This is a progress report of work previously outlined.—*N. J. Giddings.*

902. ATKINSON, EDMOND H. *Phormium tenax*. New Zealand Jour. Agric. 22: 81-86, 203-216, 283-289, 347-356; 23: 103-107, 298-302. 28 fig. 1921.—A history of the fiber production as related to methods of handling and export trade is given. The genus *Phormium*, of which 2 species, probably including several, have been described, is confined to New Zealand and Norfolk Island. It grows best in rich, well-drained, alluvial flats, and thrives in drained swamp areas. Growth habits and leaf structure are discussed. Milling was started about 1800; present methods are somewhat injurious to the fiber. The fiber, which is graded and exported to England, the U. S. A., and Australia, is used mainly in manufacturing binder twine and coarse cordage. The by-products have some fertilizer value, and the blossoms are a source of a fair grade of honey. Several parasitic fungi attack *Phormium*. Apparently the most serious disease is that commonly known as "yellow leaf." The plant is also subject to insect injury; control measures have not been satisfactorily tested.—*N. J. Giddings.*

903. AUMÜLLER, FR. Die Bedeutung der Gerstengrannen. [The significance of the beards in barley.] Illus. Landw. Zeitg. 41: 273-274. 1921.—This brief discussion of the subject includes a report of an experiment showing that the beards of barley possess transpirational and assimilatory functions.—*John W. Roberts.*

904. BAILEY, E. M. Commercial feeding stuffs. Connecticut [New Haven] Agric. Exp. Sta. Bull. 229. 295-323. 1920.—This concerns the law regarding what constitutes feeding stuffs and the state control of sale. Samples of 141 feeds were analyzed and the feeds classified into 15 groups. One molasses feed, which fell below the guaranteee in ether extract, was washed to remove the saccharine materials, after which a higher ether extract content was obtained. The coefficients of digestibility as given by Henry and Morrison are included for each class of feeds.—*Henry Dorsey.*

905. BARTLETT, H. A farmer's wheat yields. Fallow and non-fallow land compared. Agric. Gaz. New South Wales 32: 838-841. 1921.—Wheat yields from a private farm near Parkes show that, for a period of 18 years, yields from fallow land exceeded those from stubble land by 52 per cent.—*L. R. Waldron.*

906. BEATTIE, J. H. Sweet corn as a muck crop. Jour. Amer. Peat Soc. 15: 15-17. 1922.—Good yields of several varieties of sweet corn suitable for canning were secured on the Kankakee marsh in northern Indiana.—*G. B. Rigg.*

907. BISBY, G. R., and F. W. BRODRICK. Potato growing in northern Manitoba. Potato Mag. 4: 14, 18-19. 4 fig. 1921.—By the selection of 4 desirable types (thus standardizing the varieties of potatoes grown) and the introduction of certified seed, the yield and quality of potatoes grown in Manitoba has been improved.—*Donald Folsom.*

908. BLACKWELL, C. P., G. H. COLLINGS, and W. B. ROGERS. Variety tests with corn 1917-1920. South Carolina Agric. Exp. Sta. Bull. 207. 19 p. 1921.—Standard varieties of corn commonly grown in South Carolina, and new varieties and varieties which have made exceptionally good showings in other states were tested to determine those best adapted to the soil and climatic conditions of the state.—*D. B. Roscakrans.*

909. BOERGER, A. von. Sieben La Plata Jahre. [Seven La Plata years.] 47 p., 80 pl., 2 charts. Paul Parey: Berlin, 1921.—Following a general discussion of the wheat growing area "La Plata," the author discusses his special work in developing suitable strains of wheat, in fertilizer tests, and in potato culture at the Toledo and Cerro Largo Experiment Stations, Uruguay. The greater part of the book is devoted to a description of the author's work at La Estanzuela, an estate acquired by the government of Uruguay in 1907. The entire estate was divided into parcels of approximately 150 hectares each, with the area reserved for an experiment station lying in the center of the estate. Details of the arrangement of fields in

the experiment station are shown in Plate 3. Climate, soil, flora and fauna, and the surrounding agricultural population are briefly discussed. Then follows an account of the means for the work, the personal and special difficulties encountered from weather, animal pests, fungi, and weeds. The various lines of work carried on, including fertilizer tests and variety tests of grain and forage plants, are discussed. Of the forage plants, yields are reported for maize, barley, oats, *Lolium temulentum*, *L. italicum*, *Phalaris canariensis*, and *Bromus unioloides*. A special chapter is devoted to lucerne. Seed from Argentina gave the best yields but was generally inferior in purity and vitality to that from Europe. Plant breeding with small grains, maize, and flax is discussed. The remainder of the book is devoted to the organization of the pure seed movement and to a general discussion of agricultural economics, especially in the matter of wheat production and export. There are 60 half-tones showing methods of work, machinery, and crops.—A. J. Pieters.

910. BREAKWELL, E. Pastures in our wheat-growing districts. The displacement of native grasses by introduced herbage. Agric. Gaz. New South Wales 32: 685-692, 767-773, 857-865. 6 fig. 1921.—Previous probable habitats of leading native grasses are compared with present habitats, and rare occurrence of certain native species, bordering on extinction in some localities, is noted. Climatic data are given for selected points in wheat growing areas, and leading forage plants are listed. Introduced plants are dependent upon soil and climatic factors for their distribution as indicated by an analysis. Native *Danthonia* and *Stipa* grasses are not much crowded by introduced plants. Fodder values of some 20 introduced plants are discussed and compared with native grasses as to feeding values. Suggestions are made for improving the carrying capacity of pastures.—L. R. Waldron.

911. BRITTON, N. L. The leafy spurge becoming a pest. Jour. New York Bot. Gard. 22: 73-75. Fig. 1. 1921.—*Tithymalus Esula* Hill is rapidly becoming a menace to pastures in southeastern New York.—H. A. Gleason.

912. BUTLER, O. R. Storage of potatoes. New Hampshire Agric. Exp. Sta. Circ. 20. 7 p. 1920.—Sugar accumulates rapidly in potatoes stored at 32°F. and at relatively slower rates at temperatures up to 50°F. The time required for formation of sprouts varies from 60 days at 60°F., to 240 days at 39°F. Loss of weight occurs at rapidly accelerating rates in potatoes stored at 60°F., but is relatively small at 39°F. and appears to cease after 120-150 days. For culinary purposes a storage temperature of 46°F. is recommended.—G. F. Potter.

913. CHAMTLIN, M. The technique of field husbandry experimentation. Sci. Agric. 2: 14-18. 1921.—This is a discussion of the objects and methods of carrying out field experiments.—B. T. Dickson.

914. CHASE, JOHN. Sweet corn on a general suburban farm. Rept. Iowa State Hort. Soc. 55: 311-312. 1920.—The author discusses seed bed, care of crop, and selection of seed.—L. H. Pammel.

915. CLARK, CHAS. F. Development of tubers in the potato. U. S. Dept. Agric. Bul. 958. 27 p., 10 fig. 1921.—Tubers began to form shortly after the end of the period of flower-bud development. Weekly statistical studies of tubers show that nearly all the larger tubers were formed at the beginning of tuber formation. The maximum rate of growth of the tubers occurred in late August or early September, approximately 80 days after planting, or after $\frac{1}{2}$ of the total period of tuber development, and differences in size in individual hills are attributed largely to unequal rate of growth rather than age. Although weight of tuber is not correlated with the corresponding stolon length, the weights and number of tubers per hill were influenced by kind of seed piece planted. Marked differences are found in the tuber-producing capacities of different varieties, and a close relationship exists between character of soil and number and weight of tubers, lighter types of soil being superior. Data are given on effects of irrigation.—J. T. Buchholz.

916. COCKAYNE, L. An economic investigation of the montane tussock-grassland of New Zealand. *New Zealand Jour. Agric.* 23: 137-147. 6 fig. 1921.—The area studied is in the Humboldt Mountains and was originally covered with forest. It is evident that beech forests in Western Otago can be cut, burned over, and successfully replaced by grass. Ferns tend to crowd out the grass in some areas. The species of grasses occurring are listed. Rye grass and alsike clover were used in some reseeding experiments, but died out in a few years.—*N. J. Giddings.*

917. COCKAYNE, L. An economic investigation of the montane tussock-grassland of New Zealand. *New Zealand Jour. Agric.* 22: 148-157. 6 fig. 1921.—A pasture which had been closely grazed developed an excellent stand the following season. The climatic conditions covering this period are evidently important factors. A list of the plants is given and their conditions noted.—*N. J. Giddings.*

918. COCKAYNE, A. H. Improved seed-wheat. Developments in maintenance and distribution. *New Zealand Jour. Agric.* 22: 129-131. 1921.—Notes are given on certain new and improved strains of wheat, with statement of the inspection service maintained by the Department of Agriculture in the interest of pure seed. Seed wheat, registered and branded, sells at about 2s. 3d. above milling wheat prices.—*Mary R. Burr.*

919. COLE, JOHN F. Crop rotation and cultural methods at Edgeley, North Dakota. U. S. Dept. Agric. Bull. 991. 24 p., 4 fig. 1921.—The report covers the years 1905-1919. Seasonal rainfall rather than soil quality is the main controlling factor in production of crops, although the effect of cultural methods designed to conserve the supply of moisture in the soil was not marked, due to the character of the soil and to meteorological conditions. During any one season the time of plowing may have considerable effect, but through a series of years this factor is of minor importance provided seeding is not unduly delayed thereby. The effect of fallow on yield is not sufficient to warrant the wide use of this practice. Fallow may be used advantageously to eliminate weeds, though a corn crop properly cultivated may well take the place of fallow in weed control. Small grains should form a good portion of the rotation, although corn is important in spite of its low grain yield. Forage crops such as alfalfa and brome-grass are important, brome-grass being better adapted for short rotations. A rotation in which $\frac{1}{2}$ of the land not in grass is devoted to corn, $\frac{1}{2}$ to wheat on corn ground, and $\frac{1}{2}$ to a small grain on wheat ground is suggested.—*W. H. Sachs.*

920. CRESWELL, C. F., and GEORGE L. BIDWELL. Composition of cotton seed. U. S. Dept. Agric. Bull. 948. 221 p. 1921.—Variations in composition and yield of cotton seed by states, by counties, and by years and months, compiled from analyses and other records are tabulated.—*J. T. Buckholz.*

921. CUTLER, H. G. How plant breeding will popularize the barley crop. *Sci. Agric.* 1: 218-220. 1921.—This article analyzes the minor position of barley as a cereal. Encouraging results have been obtained in Alberta by crossing smooth-awned Liou and Minnesota hybrids on O.A.C. 21 and Canadian Thorpe.—*B. T. Dickson.*

922. DIETRICH, F. O. Zur Phosphorsäuredüngung. [On fertilizing with phosphoric acid.] *Mitteil. Deutsch. Landw. Ges.* 37: 76-78. 1922.—The author warns against failure to use phosphoric acid because it is scarce.—*A. J. Pieters.*

923. DOWNING, R. G. Field experiments with maize. *Agric. Gaz. New South Wales* 32: 874. 1921.—In rate of seeding experiments, heavy sowing was found more profitable. The use of 12.3 pounds of seed per acre gave 50 per cent greater yield than 6.1 pounds per acre. In another case the use of 11 pounds per acre gave a 17 per cent greater yield than 9 pounds per acre.—*L. R. Waldron.*

924. DOWNING, R. G. Rice trials at Yanco experiment farm. *Agric. Gaz. New South Wales* 32: 842. 1 fig. 1921.—A preliminary trial gave reasonably favorable results.—*L. R. Waldron.*

925. EDDY, E. D. A new seed cleaning process. *Sci. Agric.* 2: 52-54. 1921.—The author describes a method of cleaning seed by centrifugal action, the seed being in a liquid carrier of specific gravity intermediate between the specific gravities of the seeds to be separated. For cleaning clover seed the liquid has a specific gravity of 1.2. Seed is then dried by centrifugal action which is rapid and non-injurious.—*B. T. Dickson.*

926. ESSARY, S. H. *Lespedeza* (Japan clover). *Tennessee Agric. Exp. Sta. Bull.* 123, 38 p., 6 pl. 1921.—*Lespedeza striata* was probably introduced into the southern U. S. A. over 50 years ago. Its present range is from New Jersey west to Kansas and south to the Gulf. It is planted only in the South, growing wild elsewhere. It is used in the South for hay, pasture, and soil improvement. It is an annual, thus differing from the native species of *Lespedeza*, which are perennials. It is apparently always inoculated. The addition of lime to the soil is very beneficial to the crop. As commonly found, it is a mixture of strains which may be isolated by selection. It is largely if not wholly a self fertilized plant. Strains isolated breed remarkably true. Of the strains found, 3 have been propagated as of superior value in Tennessee. One of these is an early maturing variety suited to the higher parts of the State where the season is short. Another is much larger than the common kind and of a more upright habit of growth, which makes it more desirable for hay. The 3rd is late-maturing and very leafy type, well suited for pastures. The chief value of all the strains is their ability to renovate old and exhausted soils. The characters distinguishing this plant from similar legumes are described non-technically.—*S. H. Essary.*

927. FABER, HARALD. Om Novendigheden af et beskytte Danmarks Plantebestand imod farlige smitsomme Sygdomme. [Concerning the necessity of protecting Denmark's plant life against dangerous contagious diseases.] *Tidsskr. Plantcavl* 27: 523-534. 1920.—The author calls the attention of farmers to the importance of fighting plant pests. Methods of combatting domestic pests are fairly well understood, but little is known concerning many foreign pests.—*A. A. Hansen.*

928. FERRIS, E. B. Sugar cane for syrup making. *Mississippi Agric. Exp. Sta. Bull.* 190, 29 p., 1921.—This article contains a brief discussion of the history of sugar cane, soils suitable for its growth, cultural methods, varieties, fertilizers, harvesting, arrangement of syrup house, manufacturing and marketing syrup, and the use of sorghum for syrup making.—*H. B. Brown.*

929. FISKE, JESSIE G. Common thistles. *New Jersey Agric. Exp. Sta. Circ.* 113, 10 p., 4 fig., 1919.—The author describes the Canada thistle (*Cirsium arvense*), bull thistle (*C. lanceolatum*), and sow thistle (*Sonchus arvensis*),—common to different sections of New Jersey. Distinguishing features in plant structure and the character of the seed of each are emphasized. Habitat and methods of propagation and dissemination are discussed. Practical control measures are advocated.—*Mel. T. Cook.*

930. FISKE, JESSIE G. Common weeds and their control. *New Jersey Agric. Exp. Sta. Circ.* 125, 19 p., 14 fig., 1921.—The author gives illustrations (plant and seed) and the distinguishing characteristics of 14 weeds. A group of the so-called noxious weeds is discussed in detail. Common lawn weeds are listed and described. Old methods of weed control used successfully and extensively are summarized, and new suggestions for extermination are given.—*Mel. T. Cook.*

931. FITCH, C. L. Vigorous seed potatoes for Iowa. *Rept. Iowa State Hort. Soc.* 55: 218-219, 1920.—The author describes demonstration experiments to show the yield of potatoes, and advocates buying northern seed for Early Ohio because of the high yield.—*L. H. Pammel.*

932. FLOESZ, R. Erfahrungen mit dem in Herba-Silos gewonnenen Süßpressfutter in Oldenburg im Jahre 1920/21. [Experience with ensilage made in Herba-silos in Oldenburg in 1920/21.] Mitteil. *Deutsch. Landw. Ges.* 36: 708-712. 1921.—The author summarizes the results of a number of questionnaires sent to prominent farmers, and gives 8 reports on

detail. Grass is ensiled, the young growth being preferred as it packs better and has a higher protein content. Even marsh grasses and "duwoek" (*Equisetum palustre*) were successfully ensiled and made good feed. One farmer reported the successful use of a mixture of mature *Lotus corniculatus*, white clover, and old grass.—A. J. Pieters.

933. FRUDWIRTH, C. Weide und Ackerunkräuter. [Weeds in pastures and cultivated fields.] Illus. Landw. Zeitg. 41: 409. 1921.—Weed seeds surviving 7 years after a plot of ground was changed from a cultivated field to a pasture are enumerated.—John W. Roberts.

934. GERLACH. Die Entbitterung und Verfütterung der Lupinen in der eigenen Wirtschaft. [Removing the bitter principle and feeding lupins on private estates.] Mitteil. Deutsch. Landw. Ges. 36: Flughl. 60. 1921.—The author describes the standard methods and apparatus used in removing the bitter principle in lupine seeds and methods of feeding, with rations for cattle, horses, hogs, and sheep.—A. J. Pieters.

935. GERLACH. Über die Düngung mit Schwefel. [Fertilizing with sulphur.] Mitteil. Deutsch. Landw. Ges. 36: 726-727. 1921.—This is a brief account of experiments on the effect of sulphur on oats and carrots. Flowers of sulphur had no appreciable effect on the yield of either, but was somewhat harmful to the carrots.—A. J. Pieters.

936. GETTY, R. E. Forage crops in western Kansas. Kansas Agric. Exp. Sta. Bull. 225, 54 p. 1921.—Sorghums are the most productive forage crops. Sudan grass is valuable for hay and pasture. Results at Hays (1913-1919) are given, covering sorghum varieties, culture of sorghums and Sudan grass, and value of millet, alfalfa, sweet clover, annual legumes, and several minor crops.—L. F. Melchers.

937. GUTHRIE, F. B. Classification of wheat varieties. Agric. Gaz. New South Wales 32: 867. 1921.—The Royal Agricultural Society adopted the following classification of 45 wheat varieties in regard to milling qualities: Macaroni wheats, Strong flour red wheats, Strong white wheats, Medium strong flour wheats, Weak flour wheats, and Special classes.—L. R. Waldron.

938. HARUKAWA, CHIKICHI. Controlling the rice borer by submergence. Ber. Ohara Inst. Landw. Forsch. 1: 599-628. 1920.—No definite conclusions were reached, but the results of experiments seem to indicate that killing by submergence in the rice field is due to the combined action of the abnormal temperature of the water and suffocation. Probably no satisfactory results can be expected unless the maximum temperature of the water reaches 34-35°C. The author is inclined to think that under favorable conditions and good management 50 per cent or possibly more of the borers can be killed.—F. F. Halma.

939. HAUNALTER, EMIL. Die Staudenauslese. [Selection of stocks.] Oesterreich. Zeitschr. Kartoffelbau 1: 34-35, 38-40, 42-44. Illus. 1920.—Methods for potato selection and improvement are described. In the examples given yield is made the sole basis of selection, although any other character, e.g., earliness or disease resistance, might be chosen. The value of a given line is determined by an integration of the actual yield in number and weight of tubers of the individual plant with the mean and modal values of the entire line, so that only high yielding stocks of lines having high mean and modal numbers and weights of tubers are selected.—F. Weiss.

940. HENDRICK, J. The composition of the rhizomes of bracken and its variations. Kew Bull. 1921: 157-166. 1921.—The author discusses the possible value of these fern rhizomes as food for man and livestock or in the production of industrial alcohol.—E. Mead Wilcox.

941. HENDRICK, J., and J. L. ROSEDALE. The food production and requirements of Scotland. Scottish Jour. Agric. 4: 237-252. 1921.—The production of human food stuffs amounts to about 2,500,000 millions of calories, with potatoes, oatmeal, milk, and beef the most important individual sources in the order named. Less than half the food consumed in Scotland is produced in Scotland.—H. V. Harlan.

942. HENRY, W. The fragrant weed. *Sci. Amer.* 124: 406. 5 fig. 1921.—The author gives some interesting details in the art of tobacco culture as practiced in the U. S. A.—*Chas. H. Otis.*

943. HEUSER, OTTO. Die Standweite der Zuckerrüben. [The planting distance for sugar beets.] *Mitteil. Deutsch. Landw. Ges.* 36: 699-701. 1921.—Despite the fact that experiments have shown that close planting of beets results in higher yields than wide spacing, the practice of farmers tends to wider spacing. The author cites experimental evidence to show that with wide spacing the field should be cultivated later than with narrow spacing, because with the narrow spacing the ground is shaded by the leaves and loss of water is prevented. Late cultivation of wider-spaced beets gave increased yields. Wide spacing is also favored because of the possibility of substituting machine labor for expensive hand labor.—*A. J. Pieters.*

944. HILL, A. W. A visit to the Cameroons and Nigeria. *Kew Bull.* 1921: 225-244. Pl. 1-4. 1921.—This is a study of agricultural conditions and of the functions of the botanic gardens at Victoria, Cameroons.—*E. Mead Wilcox.*

945. HOFFMANN, M. D. L. G. Gründungstafel. [German Agricultural Society's green manure chart.] *Arbeit. Deutsch. Landw. Ges.* 311. 12 p. 1921.—This is a graphic representation in colors of the quantities of dry matter, nitrogen, phosphoric acid, potash, and lime in given quantities of green lupines used as green manure, as compared with heavy and light applications of stable manure. In the text the author discusses briefly the value of green manure, availability and quantity of the nitrogen, various crops to be used, and methods of seeding and plowing.—*A. J. Pieters.*

946. HOLMES, F. S. Seed inspection for 1919. *Maryland Agric. Exp. Sta. Bull.* 238. 30 p. 1920.—This report of the work accomplished by the seed inspection laboratory for the year 1919 includes analyses of various seed samples.—*E. C. Auchter.*

947. HUTCHINSON, J. Sesbania sericea as a green manure crop. *Kew Bull.* 1920: 252-254. Illus. 1920.—The possible use of this West Indian plant as a green manure crop is discussed.—*E. Mead Wilcox.*

948. JENKINS, E. H. An experiment in top-dressing a run-out meadow. *Connecticut [New Haven] Agric. Exp. Sta. Bull.* 231. 351 p. 1921.—A record is given of 6 years' yields of hay grown under various fertilizer treatments on 14 plots with 3 check plots. The greatest yields followed the use of a complete fertilizer made up of nitrate of soda, acid phosphate, and kainit. Gains over untreated plots ranged from 0.56 ton to 2.13 tons of hay.—*Henry Dorsey.*

949. KESSLER, B. Hederichbekämpfungsversuche. [Investigations on combatting wild radish ("Hederich").] *Mitteil. Deutsch. Landw. Ges.* 36: 736-738. 1921.—Experiments are reported in which a field containing wild radish and oats was divided into 3 parts, treated respectively with 61. per hectare of a 25 per cent solution of iron sulphate, the same strength of ammonium sulphate, and a dust spray mixture containing 0.7 kgm. calcium nitrate and 4 kgm. ground kainit per hectare. The dust spray was applied on the morning dew. Both liquid sprays were effective on the radish, but the iron sulphate damaged the oats. The dust spray was not so effective, but was good. The yields of oats were much greater after ammonium sulphate, though in some cases this caused lodging. The ammonium sulphate spray is recommended as the most convenient and satisfactory.—*A. J. Pieters.*

950. KRAUSS, F. G. The pigeon pea (*Cajanus indicus*): its culture and utilization in Hawaii. *Hawaii Agric. Exp. Sta. Bull.* 51. 23 p., 5 pl., 1 fig. 1921.—The pigeon pea has proved valuable as a soil renovator, as pasture for beef and dairy animals, and as a source of poultry food. The branches of the plant, cut when the pods are nearly mature, are shredded and utilized as a constituent of home-mixed concentrated feed for livestock, especially work and dairy animals. Methods of culture and utilization are recorded.—*J. M. Westgate.*

951. LEVY, E. BRUCE. *The grasslands of New Zealand. Principles of pasture establishment.* New Zealand Jour. Agric. 23: 257-265. 9 fig. 1921.—This first of a series of papers to be published on New Zealand grasslands briefly discusses pasture problems and advantages of a mixed pasture (made up of several kinds of grasses). A seed mixture for first-class pasture land is given.—*R. J. Garber.*

952. LINDHARD, E., OG J. CHR. LUNDEN. *Hosten af Roefro i 1920 og Roefrohandelen i Vinteren, 1920-21.* [Harvest of seeds of beets, etc., in 1920.] Tidsskr. Planteavl 27: 760-773. 1921.—There are 9 seed-testing stations in Denmark. The acreage (Danish acres) devoted to the production of seed during 1920 is given as follows: sugar beets, 668; beets other than sugar beets, 1998; turnips, 1067; carrots, 123. There was a decrease in acreage of about 20 percent during 1920 as compared with the pre-war (1914) years. Most of the seed is grown for export purposes.—*Albert A. Hansen.*

953. McCALL, M. A., AND HENRY F. HOLTZ. *Investigations in dry farm tillage.* Washington [State] Agric. Exp. Sta. Bull. 164. 56 p., 12 fig. 1921.—The investigations reported apply to regions having an annual rainfall of 15 inches or less. The experimental data include results on date and depth of plowing, harvest diskling and late fall diskling before fallow, immediate vs. delayed cultivation after plowing, sub-surface packing for fallow, and diskling vs. plowing for fallow. A discussion of moisture control in dry farming and of the relation of soil nitrate-nitrogen to crop production follows. The interpretation of the data in farm practice is then presented as applying to dry farming under extremely dry conditions and under more favored conditions in Washington.—*F. D. Heald.*

954. McCUALEY, C. *Seasons of varieties of cereals. Observations at Cowra experiment farm.* Agric. Gaz. New South Wales 32: 866-867. 1921.—Tables for varieties of oats and wheat are given showing comparative earliness of appearance of 1st heads, using certain varieties as standards.—*L. R. Waldron.*

955. MCCOLLAM, M. E. *Adapted pasture and hay grasses.* Monthly Bull. Western Washington Exp. Sta. 9: 7-10. 1921.—The author discusses the hay and pasture mixtures which have been found adapted to the soils of western Washington.—*F. D. Heald.*

956. MCCOLLAM, M. E. *Profitable fertilization—choosing a fertilizer.* Monthly Bull. Western Washington Exp. Sta. 8: 146-150. 1921.—The author reports gradually decreasing yields of mangels and potatoes on unfertilized muck soil and gives general advice on selecting fertilizers.—*F. D. Heald.*

957. MCGOWAN, H. E. *Commercial potato growing.* New Zealand Jour. Agric. 23: 26-29. 4 fig. 1921.—This is the 1st of a series of non-technical articles dealing with the selection, planting, culture, harvesting, and storage of potatoes.—*V. J. Ciddings.*

958. MAIER-BODE, FR. *Dünnsaat und Stickstoffdüngung.* [Thin sowing and nitrogen fertilization.] Illus. Landw. Zeitg. 41: 305-306. 1921.—This brief report of plot experiments shows that the heaviest and most profitable yields of rye were obtained in the more thinly sown plots receiving the heavier applications of ammonium sulphate.—*John W. Roberts.*

959. MEISNER. *Erfahrungen über den Luzernebau in Baden.* [Experiences with lucerne culture in Baden.] Mitteil. Deutsch. Landw. Ges. 35: 503-506. 1921.—The information secured from 24 questionnaires sent to farmers in Baden is given in detail and summarized.—*A. J. Pieters.*

960. NICHOLSON, G. *Winter fodder trials at Nyngan.* Agric. Gaz. New South Wales 32: 892. 1921.—Using Firbank wheat as standard (100 per cent), the various crops yielded as follows: rape, 242 per cent; mustard, 231 per cent; barley, 177 per cent; Sunrise oats, 176 per cent; hull-less barley, 136 per cent; and Hard Federation wheat, 86 per cent.—*L. R. Waldron.*

961. OYE, PAUL VAN. *Iets over de microflora en fauna der rijstvelden in verband met de praktijk.* [Concerning the microflora and microfauna of rice fields in connection with practice.] *Naturwissenschaften. Tijdschr.* 3: 121-125. 1921.—The question is discussed as to whether or not flooding rice fields, for the purpose of fish culture, after the crop is removed is injurious to succeeding rice crops. A review of the work on the microflora and microfauna of rice fields is given.—*C. D. La Rue.*

962. PAPVLASSOPOULOS, G. *L'ile de Corfu au point de vue agricole, autrefois et aujourd'hui.* [The agriculture of Corfu, formerly and today.] 118 p., 1 pl. Athens, 1921.—The chapters of this book are as follows: (1) Geographical and historical information regarding the Island of Corfu; (2) natural conditions controlling agricultural production (study of soil, water, and climate); (3) social conditions that affect production (population, agricultural societies and associations, measures taken by the state); (4) economic conditions in agricultural production (landed property, capital, labor, and agricultural laborers); (5) agricultural production, areas cultivated, natural flora, cereals, dry pulse, vegetable products, plants useful in industry, vines, olives, fruit trees, ornamental plants, forage plants, and animal and related industries.—*B. Krimpas.*

963. PINN, A. J. *Legumes that needed nitrogen.* *Agric. Gaz. New South Wales* 32: 903. 1921.—An instance is recorded of the value of nitrogenous manures applied to peas and beans.—*L. R. Waldron.*

964. PINN, A. J. *Some notes on the potato-growing industry.* *Agric. Gaz. New South Wales* 32: 881-884. 1921.—These notes on the potato industry in Tasmania include remarks on inspection, varieties, and culture. Tasmanian potatoes are sold in the Sydney market.—*Mary R. Burr.*

965. PITTS, J. M. *Farmers' experiment plots. Summer fodder trials, 1920-21.* *Agric. Gaz. New South Wales* 32: 853-856. 2 fig. 1921.—Maize yielded up to 26 tons per acre, green weight; Saccaline, a variety of sorghum, up to 30 tons; and Sudan grass 10 tons of green forage per acre.—*L. R. Waldron.*

966. REAGAN, ALBERT B. *Wild or Indian rice.* *Proc. Indiana Acad. Sci.* 1919: 241-242. 1921.—The author describes *Zizania aquatica* L., found growing abundantly in Nett Lake, Minnesota, and gives the methods employed by the Indians in gathering, preparing for market, and using wild rice.—*F. C. Anderson.*

967. ROBERTS, H. F. *Principal noxious weeds of Kansas.* *Kansas Agric. Exp. Sta. Circ.* 81. 19 p. 1920.—Important weeds occurring in Kansas are described and methods for their eradication or control are given.—*L. E. Melchers.*

968. SALMON, S. C., AND J. H. PARKER. *Kanoata: an early oat for Kansas.* *Kansas Agric. Exp. Sta. Circ.* 91. 13 p. 1921.—An early-maturing, good-yielding strain of Fulchum oats, apparently resistant to late spring freezes and adapted to Kansas conditions, is described. This strain also shows some resistance to oat smut but is not immune. It is susceptible to both stem and leaf rusts.—*L. E. Melchers.*

969. SCHAFER, E. G., AND R. O. WESTLEY. *Sunflower production for silage.* *Washington [State] Agric. Exp. Sta. Bull.* 162. 20 p., 4 fig. 1921.—This general consideration of sunflower growing for silage gives yields obtained on the experiment station plots. The comparative value of corn and sunflowers for silage is discussed and suggestions are given for the feeding of sunflower silage. Rust, powdery mildew, and stem rot, or *Sclerotinia* wilt, are briefly described.—*F. D. Head.*

970. SCHAFER, E. G., E. F. GAINES, AND O. E. BARBEE. *Cultural experiments with wheat.* *Washington [State] Agric. Exp. Sta. Bull.* 160. 19 p., 8 fig. 1921.—The experiments included the application of manure, the testing of summer fallow methods, rotation studies

and time and depth of plowing for spring wheat. It was found that early-plowed, well-tilled summer fallow gives a greatly increased yield (11.8 bushels; over summer fallow plowed late and left untilled).—*F. D. Heald.*

971. SCHAFER, E. G., E. F. GAINES, and O. L. BARBEE. Wheat production. Washington [State] Agric. Exp. Sta. Bull. 159. 34 p., 10 fig. 1921.—Varieties are described and discussed from the standpoint of distribution, field yields, nursery yields, comparative value, and adaptation to different Washington conditions. Three-year tests on the effect of time of seeding on yield showed Aug. 15 and Sept. 1 to be preferable (the latter slightly better). Results previously reported [Washington State Agric. Exp. Sta. Bull. 120] on the effect of time of seeding fall wheat on the per cent of smut were corroborated, the early seedings (Aug. 1-Sept. 1) giving traces or only a low percent. From the standpoint of both yield and freedom from smut, Aug. 15-Sept. 1 seems an especially favorable time for seeding winter wheat in summer fallow. No increase in yield was obtained by bringing seed each year from Minnesota or North Dakota. Of the wheat varieties tested, 8 originated at the Washington Station as a result of hybridization. This group included the highest yielders, the 3 highest being Triplet, Hybrid 128, and Ruddy, with average yields of 43.1, 42.7 and 42.5 bushels for 1914-1919.—*F. D. Heald.*

972. SCHARNAGEL, TH. Vergleichende Sortenversuche mit Wintergetreide 1920/21 auf dem Versuchsfelde der Landessaatzuchtanstalt Weihenstephan. [Comparative tests with varieties of winter grain in the experimental field of the Weihenstephan crop-breeding institute in 1920/21.] Illus. Landw. Zeitg. 41: 321-322. 1921.—This is a report of variety tests of winter wheat, rye, and barley.—*John W. Roberts.*

973. SEIFERT, ALFRED. *Phormium tenax* as a farm crop. New Zealand Jour. Agric. 22: 90-92. 1921.—It is believed that many farmers could well afford to cultivate New Zealand flax (*Phormium tenax*), and that the return per acre would be greater than from dairying.—*N. J. Giddings.*

974. SLATE, WILLIAM L., JR., and B. A. BROWN. Seed potatoes for Connecticut. Storrs [Connecticut] Agric. Exp. Sta. Bull. 107. 51-56. 1921.—Trials extending over 5 years show a gradual reduction in yielding capacity up to the 4th year, when the yield is but 47 per cent of that of new seed from the north. In 1920 certified seed gave 62 bushels increase over non-certified seed and 7 per cent increase in U. S. grade No. 1. The following year the increase for certified seed was 44 bushels and 5 per cent for U. S. grade No. 1. Green Mountain, in a 6-year period of testing, has produced on the average 60 bushels more per acre than Irish Cobbler. New seed from the north was used in all these comparisons.—*Henry Dorsey.*

975. SMITH, WILLIAM J. Common weeds. Scottish Jour. Agric. 4: 14-28, 129-140, 282-290, 382-394. 1921.—Many weeds common in Scotland are described, their occurrence in agricultural crops given, and methods of eradication suggested.—*H. V. Harlan.*

976. STEAD, ARTHUR. The value of the paddock system. Jour. Dept. Agric. Union of South Africa 3: 131-135. 1921.—The following conclusions are reached with reference to the paddock system for sheep grazing: (1) It permits of resting some camps while others are being grazed,—in this way giving desirable plants as good a chance to develop as those of less worth; (2) it ensures the manuring of the whole veld; (3) it ensures that the greatest possible proportion of the rainfall becomes available to the vegetation of the veld, and checks trampling out and erosion of the veld; (4) it permits making hay at the right time; (5) it saves food by minimizing the external work of animals, and also permits of a lower quality in the food supply.—*Mary R. Burr.*

977. SUMMERBY, R. A new hardy variety of winter wheat. Sci. Agric. 2: 168-169. 1921.—Kharkov 2212, issued under the name Kharkov 22MC, has been tested at Macdonald College

(Quebec) and found hardy and a good yielder. It is an awned variety with glabrous white glumes, medium-sized semi-hard to hard red kernels, long narrow leaves, and good length and strength of straw.—*B. T. Dickson.*

978. TICE, C. The potato in B[ritish] C[olumbia]. Agric. Jour. [British Columbia] 6: 244, 248. 1921.—See Bot. Absts. 10, Entry 1520.

979. TICE, C. The potato situation in B[ritish] C[olumbia]. Agric. Jour. [British Columbia] 6: 144, 2 fig. 1921.

980. VINALL, H. N., and R. E. GETTY. Sudan grass and related plants. U. S. Dept. Agric. Bull. 981. 67 p., 24 fig. 1921.—Sudan grass, *Andropogon sorghum sudanensis*, is described in detail. Since its introduction into the U. S. A. in 1909 it has been tested and successfully grown in Australia, South America, the Philippines, Hawaii, Porto Rico, and Cuba. Its crop value in the U. S. A. in 1918 was estimated at \$10,500,000. It is grown most successfully in Texas, Oklahoma, and Kansas because it can withstand long periods of drought and recovers quickly when rain comes. The grass is most valuable as a hay crop, although it cures slowly on account of its juicy stems. Experiments show that the grass grown in humid regions has a low percentage of protein and ash, also that,—although a valuable summer pasture,—care must be taken in pasturing with cattle on account of the danger of prussic-acid poisoning. Results of experiments in different parts of the U. S. A. to determine best rates, dates, and methods of seeding for producing hay and seed are given. The diseases and insects which attack sorghums also injure Sudan grass.—*Catherine M. Smith.*

981. WADE, J. S. Notes on ecology of injurious Tenebrionidae. Entomol. News 32: 1-6. 1921.—“Some genera of native Tenebrionidae (darkling beetles) at one time considered of negligible economic importance are becoming, in the larval stage, each year more destructive to newly sown wheat and other grains over the semi-arid regions of middle and western” U. S. A. The larvae, which destroy the grain before and during germination, are most abundant in well drained sandy or loamy soil. They prefer thinly covered ground to heavy grass sod, and are common under small piles of trash, edges of straw piles, etc. Serious damage often follows when a cereal crop is planted on old pasture or adjacent land. Grain crops continued without rotation are conducive to their increase.—*O. A. Stevens.*

982. WEBER, E. Einfluss des Düngeraufwandes auf die Intensität des Wirtschaftsbetriebes. [The effect of fertilizer costs on the intensity of farm-management.] Mittell. Deutsch. Landw. Ges. 36: 683-686. 1921.—In this lecture before the fertilizer section of the German Agricultural Society the author discussed the relation between the cost of labor and fertilizers and the intensive production of crops.—*A. J. Peters.*

983. WENHOLZ, H. Improving the maize yield. What the department is doing for the farmer. Agric. Gaz. New South Wales 32: 761-766, 868-874. 1921.—The discussion covers seed improvement; variety trials; new varieties; growing contests; and experiments in fertilizing and rotation.—*L. R. Waldron.*

984. WHITTET, J. N. Recent trials with grain sorghums. Season, 1920-21. Agric. Gaz. New South Wales 32: 875-880. 2 fig. 1921.—At Cowra, feterita yielded 1800 pounds of grain per acre in drills 3 feet apart. Kaoliang was much inferior. At Bathurst, milo and kaoliang each produced over 1 ton of grain per acre. At Wagga, with a decreased rainfall, the grain yields were 400-900 pounds per acre. More extensive trials with these grain sorghums are recommended.—*L. R. Waldron.*

985. WOODS, A. F. Research in the field of agriculture. Science 55: 64-66. 1922.—For increasing population of the world and failure of some countries to produce food sufficient for their needs present an ever-increasing problem. The author, explaining the necessity for agricultural research, suggests it as the solution of the problem and urges upon colleges and universities the need of promoting and encouraging it.—*Mary R. Burr.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 891, 893, 898, 966, 1123, 1211, 1487, 1495, 1530, 1533, 1589, 1635, 1682, 1690, 1732, 1842, 1854, 1888, 1910, 1950, 2019, 2051, 2052, 2057, 2062)

986. ANONYMOUS. Augustin de Candolle. *Kew Bull.* 1920: 219-220. 1920.

987. ANONYMOUS. Biologie Medicale. Revue mensuelle des sciences biologiques considérées dans leur rapports avec la médecine, publiée sous la direction de F. Billon. 92 rue Vieille-du-temple. Paris, 30 fr. [Medical biology. Monthly review of the biological sciences, as related to medicine; published under the direction of F. Billon.] *Bull. Sci. Pharm.* 28: 274. 1921.

988. ANONYMOUS. David Ernest Hutchins. *Kew Bull.* 1921: 32-33. 1921.

989. ANONYMOUS. Dr. John H. Wilson. *Kew Bull.* 1920: 71. 1920.

990. ANONYMOUS. Edgar W. Foster. *Kew Bull.* 1921: 222. 1921.

991. ANONYMOUS. Edoardo Beccari. *Kew Bull.* 1920: 369-370. 1920.

992. ANONYMOUS. Emily Hitchcock Terry. Carnegie Foundation Advancement Teaching Ann. Rept. 16: 171-172. 1921 [1922].—Born 1838; graduated from Mount Holyoke College, 1859; married Rev. Cassius M. Terry, 1870; at Smith College, 1881-1908; died, Feb. 6, 1921.—*C. W. Dodge.*

993. ANONYMOUS. Flowering Plants of South Africa. *Kew Bull.* 1920: 374. 1920.—This is a notice of the new magazine "The Flowering Plants of South Africa" edited by I. B. Pole-Evans.—*E. Mead Wilcox.*

994. ANONYMOUS. George Badderly. *Kew Bull.* 1921: 222. 1921.

995. ANONYMOUS. Gift of drawings of South African flowers. *Kew Bull.* 1921: 223. 1921.—These 34 drawings, of characteristic flowers of the Cape of Good Hope, were made by Miss Catherine Frances Frere.—*E. Mead Wilcox.*

996. ANONYMOUS. Henry F. C. Sander. *Florists' Exchange* 51: 137. *Fig. 1.* 1921.—This is an obituary article, the greater part of which recounts Mr. Sander's work on orchids.—*Lua A. Minns.*

997. ANONYMOUS. Henry Powell. *Kew Bull.* 1920: 220-221. 1920.

998. ANONYMOUS. J. S. J. McCall. *Kew Bull.* 1921: 253-254. 1921.

999. ANONYMOUS. James Ramsay Drummond. *Kew Bull.* 1921: 123. 1921.

1000. ANONYMOUS. James Robertson Pitcher. *Florists' Exchange* 52: 1311-1312. *1 fig.* 1921.—This obituary sketch relates Mr. Pitcher's unusual interest in orchids, and his connections with the United States Nurseries at Short Hills, New Jersey, where, at one time, was gathered together one of the most complete collections of commercial plants to be found in the U. S. A.—*Lua A. Minns.*

1001. ANONYMOUS. John Chisnall Moore. *Kew Bull.* 1920: 250. 1920.

1002. ANONYMOUS. John Gilbert Baker. *Kew Bull.* 1920: 319-320. 1920.

1003. ANONYMOUS. **John Reader Jackson.** Kew Bull. 1920: 368-369. 1920.

1004. ANONYMOUS. **Joseph Meehan, the Nestor among nurserymen.** Florists' Exchange 51: 7. *I fig.* 1921.—This is an obituary sketch of the life and work of Joseph Meehan.—*Lua A. Minns.*

1005. ANONYMOUS. **Lady Hanbury.** Kew Bull. 1920: 286-287. 1920.

1006. ANONYMOUS. **List of staff in botanical departments at home, and in India and the colonies.** Kew Bull. 1920: 27-41. 1920.

1007. ANONYMOUS. **Liste des membres de la Société Royale de Botanique de Belgique.** [List of members of the Royal Botanical Society of Belgium.] Bull. Soc. Roy. Bot. Belgique 54: 251-259. 1921.

1008. ANONYMOUS. **Mr. Eugene Campbell.** Kew Bull. 1921: 222. 1921.—This is a notice of the retirement of Mr. E. J. F. Campbell as curator of the Botanic Station, Belize, British Honduras.—*E. Mead Wilcox.*

1009. ANONYMOUS. **Presentations to the library during 1919.** Kew Bull. 1921: 39-42. 1921.

1010. ANONYMOUS. **Presentations to the library during 1920.** Kew Bull. 1920: 42-45. 1920.

1011. ANONYMOUS. **Professor Adolf Engler.** Kew Bull. 1921: 222. 1921.—This is a notice of the retirement of Dr. Engler from the directorship of the botanic gardens and museums at Dahlem, Berlin. He is succeeded by Dr. L. Diels.—*E. Mead Wilcox.*

1012. ANONYMOUS. **Prof. J. W. H. Trail.** Kew Bull. 1920: 32-33. 1920.—A list of publications supplementary to list in Kew Bull. 1919: 381.—*E. Mead Wilcox.*

1013. ANONYMOUS. **Publications of the staff, scholars, and students of the New York Botanical Garden during the year 1920.** Jour. New York Bot. Gard. 22: 78-85. 1921.

1014. ANONYMOUS. **Rear-Admiral Sir Richard Massie Blomfield, K. C. M. G.** Kew Bull. 1921: 221. 1921.

1015. ANONYMOUS. **Robert Allen Rolfe.** Kew Bull. 1921: 123-127. 1921.

1016. ANONYMOUS. **Sir Edmund Giles Loder, Bart.** Kew Bull. 1920: 175. 1920.

1017. ANONYMOUS. **Sir J. D. Hooker.** [Rev. of: BOWER, F. O. *Joseph Dalton Hooker.* 62 p. *Portrait.* Soc. Promoting Christian Knowledge: London, 1919 (see Bot. Absts. S. Entry 72).] Kew Bull. 1920: 287-288. 1920.

1018. ANONYMOUS. **The Indian Botanical Society.** Kew Bull. 1921: 127-128. 1921.—This society was organized December 6, 1920, with Dr. Winfield Dudgeon as president.—*E. Mead Wilcox.*

1019. ANONYMOUS. **William Harris.** Kew Bull. 1921: 31-32. 1921.

1020. ANONYMOUS. **William Tyson.** Kew Bull. 1920: 176. 1920.

1021. AERDSCHOT, P. VAN. *Travaux botaniques publiés en Belgique ou par des botanistes belges de 1914 à 1920.* [Botanical works published in Belgium or by Belgian botanists, 1914-1920.] Bull. Soc. Roy. Bot. Belgique 54: 224-245. 1921.—Works by foreign authors are marked by an asterisk.—*Henri Michels.*

1022. ASHLEY, W. *The place of rye in the history of English food.* Economic Jour. 31: 285-308. 1921.—This is a historical survey of the decline of rye as a foodstuff from 1240 to the present, and the corresponding increase in the use of wheat. Maslin, a crop obtained by sowing rye and wheat together in varying proportions, was a very common crop. Considerable information is given regarding the use of barley and oats during the same period.—*C. W. Dodge.*

1023. B[EAR], W. J. *The Journal of Pomology.* Kew Bull. 1920: 76-77. 1920.—A new quarterly journal edited by E. A. Bunyard and published at London is announced.—*E. Mead Wilcox.*

1024. BREHM, Die Bedeutung der Botanik für die Praxis der Landwirtschaft. [The significance of botany in the practice of agriculture.] Illus. Landw. Zeitg. 41: 299-300, 306-307. 1921.

1025. BRITTON, JAMES. *Frances Arabella Rowden.* Jour. Bot. 59: 329-331. 1921.—This is a short biography of the author of *Poetical Introduction to the Study of Botany*, published in 1801.—*Adele Lewis Grant.*

1026. BRITTON, N. L. *George Valentine Nash.* Jour. New York Bot. Gard. 22: 145-148. *Portrait.* 1921.

1027. BRITTON, N. L. *Stewardson Brown.* Jour. New York Bot. Gard. 22: 110-112. 1921.

1028. BRITTON, N. L. *William Harris.* Jour. New York Bot. Gard. 22: 13-14. 1921.

1029. BUTLER, E. J. *The Imperial Bureau of Mycology.* Trans. British Mycol. Soc. 7: 168-172. 1921.—This paper recounts briefly the causes leading up to the establishment of the bureau at London and of its proposed activities. The activities will be directed mainly along 2 lines, (1) the accumulation and distribution of information on all matters connected with plant diseases, and (2) the identification of species of injurious fungi. As a part of the 1st of these activities it is proposed to establish a periodical abstracting journal [Review of Applied Mycology].—*W. B. McDougall.*

1030. D., A. T. *John Lewis Childs.* Florists' Exchange 51: 601. *Fig. 1.* 1921.—This is an obituary sketch.—*Lua A. Minns.*

1031. DIXON, R. B. *Methods and principles.* [Rev. of WIENER, L. *Africa and the discovery of America.* Vol. I. xix + 290 p. Innes & Sons: Philadelphia, 1920 (see Bot. Absts. 11, Entry 1075).] Amer. Anthropologist 22: 178-184. 1920.

1032. DIXON, R. B. *Words for tobacco in American Indian languages.* Amer. Anthropologist 23: 19-49. 1921.—This is a polemic, replying to WIENER, L. *Africa and the discovery of America* Vol. I. xix + 290 p. Innes & Sons: Philadelphia, 1920 [see Bot. Absts. 11, Entry 1075; also preceding entry], and presenting additional information regarding words for tobacco.—*C. W. Dodge.*

1033. DOWHERTY, T. K. *The International Institute of Agriculture.* Sci. Agric. 1: 248-250. 1921.—This is an account of the proceedings of the General Assembly, Nov. 3-11, 1920, held in Rome.—M. Louis Dop of France reported on agricultural meteorology, presenting

conclusions which were adopted. These provide for the creation of a Permanent Committee of Agricultural Meteorology, the members to be named by the ministers of agriculture of each country and chosen from among meteorologists, agronomists, botanists, plant pathologists, and related scientists.—The governments are requested to ratify as soon as possible the International Convention of Plant Pathology of March 4, 1914, or approve its conclusions and consent to organize in their own countries the necessary departments of plant pathology.—The proposal of Professor Eriksson for the creation of an International Research Institute of Plant Pathology was adopted. The Institute is to be entrusted with centralizing all publications and materials (herbaria, collections of insects, etc.) concerning plant pests and the enemies of plants.—*R. T. Dickson.*

1034. D[UNN], S. T. William Alexander Talbot. *Kew Bull.* 1921: 93-94. 1921.

1035. D[UNN], S. T. William James Tutcher. *Kew Bull.* 1920: 136-138. 1920.

1036. DURAND, E. D. Agriculture in eastern Europe. *Quart. Jour. Economics* 36: 169-196. 1922.—This survey of agricultural practice in Russia and Poland calls attention to small holdings, land tenure, shallow plowing, slight rotation of crops, fallowing 1 year in 3, and parcelation of land. The *mir* system of land tenure, including periodic redistribution, is discussed at length. Modern methods of cultivation on large estates are contrasted with peasants methods, and mention is made of changes, including parcelation of big estates, induced by the revolution and subsequent famine.—*C. W. Dodge.*

1037. ELWES, H. J. The Earl of Duncie. *Kew Bull.* 1921: 310-317. 1921.

1038. G., TH. Edward J. Canning. *Florists' Exchange* 52: 1121. 1921.—This is a short obituary sketch of a well known horticultural expert, landscape gardener, and florist, under whose administration the botanical gardens of Smith College became known throughout the country as among the finest at any American collegiate institution.—*Lua A. Minns.*

1039. G., TH. James F. M. Farquhar. *Florists' Exchange* 51: 1323. *Fig. 1.* 1921.—This is an obituary of the vice-president of R. & J. Farquhar & Co., one of the notable horticulturists of Boston, interested in lilies, rhododendrons, and dahlias.—*Lua A. Minns.*

1040. G., TH. John K. M. L. Farquhar. *Florists' Exchange* 52: 247. *Fig. 1.* 1921.—This is an obituary notice of the president of R. & J. Farquhar & Co.—*Lua A. Minns.*

1041. G., TH. Walter Hunnewell. *Florists' Exchange* 52: 829. 1921.—The large estate of the deceased at Wellesley, Massachusetts, has a world-wide reputation for its collection of trees and evergreen shrubs, and for its Italian garden. Here were also tried out hundreds of the plants brought from China, Japan, and Korea by E. H. Wilson.—*Lua A. Minns.*

1042. GRAVIS, [A.] Ch. E. Bertrand, 1851-1917. *Bull. Soc. Roy. Bot. Belgique* 54: 147-149. 1921.—Professor Bertrand, an anatomist and paleobotanist, professor in the University of Lille, was born in 1851 and died in 1917.—*Henri Micheels.*

1043. GREEVES, E. M. Plant lore in olden times. *Art and Archaeol.* 13: 145. 1922.—The author presents brief notes concerning the symbolism and folk lore of plants in ancient and mediaeval times.—*C. W. Dodge.*

1044. H., V. A. L'abbé Provancher (continué de la page 270 du volume précédent). *Nat. Canadien* 48: 56-63, 79-88, 109-113, 133-140. 1921.—These are installments of a biographical sketch of the great Quebec naturalist who was the founder of *Le Naturaliste Canadien*. To be continued.—*A. H. MacKay.*

1045. HALLE, T. G. Alfred Gabriel Nathorst en Minnesteckning. [An appreciation of A. G. Nathorst.] Geol. Fören. Förhandl. 43: 241-280. 1921.—This is an illustrated account of the life and work of this eminent paleobotanist and geologist.—*E. W. Berry.*

1046. HALLE, T. G. Förteckning pa A. G. Nathorsts skrifter 1869-1920. [Bibliography of the contributions of A. G. Nathorst.] Geol. Fören. Förhandl. 43: 281-311. 1921.

1047. H[ILL], A. W. George Ralph Pierez. Kew Bull. 1921: 221. 1921.

1048. HUTCHINSON, J. Bothalia. Kew Bull. 1921: 176. 1921.—This is a notice of the establishment of the new publication entitled Bothalia; a Record of Contributions from the National Herbarium, Union of South Africa, edited by I. B. Pole-Evans.—*E. Mead Wilcox.*

1049. JATUL, P. A. Mažas Botaniškasis Žodynėlis. Dalis I. Augmenų Vardai. [Small botanical vocabulary. Part I. Plant names.] Želmenija 1: 6-16, 20-32, 35-46. 1 fig. 1921.—The author lists plants alphabetically under their Lithuanian names, with scientific names and English equivalents.—*C. W. Dodge.*

1050. JONES, L. R., and G. W. KEITT. Eugene Washburn Roark. Phytopathology 11: 327. 1921.—A short biography and appreciation is given.—*B. B. Higgins.*

1051. KEYS, A. The agricultural department, Dominica. Kew Bull. 1921: 67-85. 1921.—This is an account of the botanical work done at the Botanic Station during the 28 years of its existence.—*E. Mead Wilcox.*

1052. KIMBALL, WINIFRED. Reminiscences of Alvan Wentworth Chapman. Jour. New York Bot. Gard. 22: 1-11. 1921.—The author's personal acquaintance with Chapman extended from 1887 till his death in 1899. The article presents numerous features of his character and personality.—*H. A. Gleason.*

1053. LARSEN, TH., og CARL MARIBOE. Oversigt over Fremmed Litteratur for Aar 1919. [Review of foreign literature for the year 1919.] Tidsskr. Planteavl 27: 774-831. 1921.—This well arranged and classified index of agricultural literature for the year 1919 includes European, American, and Asiatic literature.—*Albert A. Hansen.*

1054. PILGER, R. Georg Hieronymus. Hedwigia 62. Four pages unnumbered, immediately preceding page 241. 1921.—Georg Hieronymus was born in 1846 and died in 1921. In early life he joined P. G. Lorentz in an exploration of the Argentine Andes, and he was later made Professor of Botany in the University of Cordoba, Argentine Republic. The collections of Lorentz and Hieronymus formed the foundation for a knowledge of the higher plants of the Argentine mountains. In 1883 Hieronymus returned to Germany, settled in Breslau, and gave his time largely to the study of the algae especially the Myxophyceae of Schlesien. Large collections were made, and important taxonomic and cytologic studies followed. He also contributed material for the treatment of several families of seed plants in Engler and Prantl. In 1892 he was called to the Botanical Museum in Berlin, where he extended his field of activity to include certain of the *Pteridophyta*.—*Bruci Fink.*

1055. SAVASTANO, L. Gli scritti agrarii di Vincenzo Semola. [The agricultural writings of Vincenzo Semola.] Ann. R. Staz. Sper. Agrum. e Fruttic. Acireale 4: vii-xv. 1916-1918 [1919].—This is a biographical sketch of Vincenzo Semola, and a review of his works: Della Caprifificazione; Della Natura e Genesi del Moscherino del Caprificio; Delle Varietà di Vitigni del Vesuvio e del Somma; Del Baco dell' Uva.—*I. Bonazzi.*

1056. SCHILLENBERG, GUSTAV. Die Sammlungen des Kieler Universitätsherbars. [The collections of the Kiel University herbarium.] Beih. Bot. Centralbl. II Abt. 38: 389-398.

1921.—The herbaria are divided into a general and a provincial herbarium, with phanerogams and vascular cryptogams from Schleswig-Holstein only in the latter. The foundation for the general herbarium was the collection of Lucae, a druggist in Berlin. Other herbaria of earlier times were those of Fröhlich, Moldenhawer, Fabricius, Forehammer, Nolte, Hansen, Weber, Giseke, Forster, Petersen, Ebermeyer, and of the Galathaea-expedition, all of which were placed in these 2 collections. Kiel has 45 fascicles of bryophytes, 53 of fungi, 4 boxes of myxomycetes, 165 fascicles of lichens, and 130 of algae. The localities represented are listed.
—*L. Pacc.*

1057. SHAPOVALOV, M. Russian Mycological and Phytopathological Society. Phytopathology 11: 346-347. 1921.—The Russian Mycological and Phytopathological Society was organized in 1920 and seems at present to be in a vigorous condition.—*R. B. Higgins.*

1058. SHILEIKIS, M. J. Bernard de Jussieu 1699-1777 garsusis Francuzu botanikas ir filozofas. [Bernard de Jussieu 1699-1777, celebrated French botanist and philosopher.] Želmenija 1: 19. *Portrait.* 1921.

1059. SHILEIKIS, M. J. Linnaeus 1707-1778. Carl von Linnē arba Linnaeus Garsusis Švedų Botanikas. [Linnaeus, 1707-1778, Carl von Linné or Linnaeus, famous Swedish botanist.] Želmenija 1: 3. *Portrait.* 1921.

1060. SK[KAN], S. A. Catalogue of the library. Kew Bull. 1920: 256. 1920.—This is a catalogue of accessions to the Kew library since the original catalogue published in 1899 down to 1915.—*E. Mead Wilcox.*

1061. SK[KAN], S. A. Reginald Farrer. Kew Bull. 1920: 370-371. 1920.

1062. SK[KAN], S. A. Sir William MacGregor. Kew Bull. 1920: 31-32. 1920.

1063. SKOTTBERG, C. The old Linnaean garden at Upsala. Kew Bull. 1920: 221. 1920.—This is an account of the restoration and preservation of the garden and house of Linnaeus.—*E. Mead Wilcox.*

1064. SPALDING, PERLEY. Bibliographie der Pflanzenschutzliteratur. Das Jahr 1920. Phytopathology 11: 377. 1921.—The author reports a new indexing periodical issued, for exchange, by the Biologische Reichsanstalt für Land- und Forstwirtschaft in Berlin-Dahlem.—*B. B. Higgins.*

1065. SPRAGUE, T. A. Bluff et Fingerhuth, Compendium Florae Germaniae. Ed. 2. Kew Bull. 1920: 72-74. 1920.—This edition appeared 1836-1838, and was edited by Bluff, C. G. Nees von Esenbeck, and Schauer. It contains names not noted in the Index Kewensis, of which 21 are here listed. These are to be included in the 6th Supplement to the Index Kewensis.—*E. Mead Wilcox.*

1066. SPRAGUE, T. A. Dr. George V. Perez. Kew Bull. 1920: 175-176. 1920.

1067. SWARZ, H. F. Tobacco as a cure for ailments. Natural History 21: 317-319. 1921.—The author describes many of the uses of tobacco among the Indians,—as a medicine, a charm, and in ceremonials.—*Albert R. Sweetser.*

1068. THAXTER, ROLAND. Lincoln Ware Riddle. Rhodora 23: 181-184. 1921.—This short biographical sketch of the late Lincoln Ware Riddle (1850-1921), Assistant Professor of Cryptogamic Botany and Associate Curator of the Cryptogamic Herbarium at Harvard University, is concluded with a list of his publications. —*James P. Pool.*

1069. TIMM, R. Karl Warnstorff. *Hedwigia* 63: 1-6. 1921.—Warnstorff was 83 years old and was the Nestor of German bryologists when he died in February, 1921. His *Leber-, Torf-, und Laubmoosflora der Mark Brandenburg*, the result of 40 years of study, is a monument to his painstaking activity, in which a considerable amount of valuable originality of methods was displayed. Many of the species collected in the preparation of this work are contained in his *Exsiccati*, the distribution of which began in 1872. Many minor publications resulted from his studies, and his *Europäischen Torfmooze* was translated into French. His work on the moss-flora of Brandenburg finished in 1906, he went to Berlin to complete his contribution on the Sphagnales for Engler's *Pflanzenreich*. His work on the Sphagnales culminated in his *Sphagnologia Universalis*, which he regarded as his most valuable contribution to bryology. One genus and 18 species and subspecies were named for Warnstorff.—*Bruce Fink*.

1070. TURNER, E. P. Obituary.—Sir David Ernest Hutchins 1850-1920. *Trans. and Proc. New Zealand Inst.* 53: vii-viii. *Portrait*. 1921.—A synopsis is given of the life of Sir D. E. Hutchins and his work as forester in India, South Africa, Australia, and New Zealand.—*Wm. Randolph Taylor*.

1071. TURRILL, W. B. Botanical exploration in Chile and Argentina. *Kew Bull.* 1920: 57-66. 1920.—This is a history of botanical exploration in Chile and Argentina from 1516 to date.—*E. Mead Wilcox*.

1072. T[URRILL], W. B. Botanical exploration in Chile and Argentina. *Kew Bull.* 1920: 223-224. 1920.—This supplements a preceding paper [see preceding entry].—*E. Mead Wilcox*.

1073. UPHOF, J. C. T. The phytopathological service in the Netherlands and its colonies. *Kew Bull.* 1921: 326-330. 1921.

1074. WHETZEL, H. H. The present status of plant pathology in agriculture. *Ann. Rept. Quebec Soc. Protection of Plants* 13: 24-30. 1921.—The author sketches the development of American plant pathology through the purely mycological stage to the economic, which arose as a result of the discovery of Bordeaux mixture. It is pointed out that many workers are still mycological in training and point of view. The situation in New York State is used as an illustration of the fact that plant pathology as an economic factor in agriculture is appreciated. Still greater developments are predicted.—*R. T. Dickson*.

1075. WIENER, L. Africa and the discovery of America. Vol. I. *six + 290 p., 22 pl.* Innes & Sons: Philadelphia, 1920.—This critical examination of the documents relating to the discovery and early exploration of America from the point of view of the philologist contains many quotations and much information regarding the historical and philological evidence for the geographical distribution of tobacco, manioc, yams, sweet potatoes, and peanuts. From philological evidence the author concludes that the above plants are probably of Old-World origin, arriving in America along with the negro, either before or at the time of the early Spanish and Portuguese explorers. Information is given regarding a number of other plants which at some time have been connected with the philology of the above plants: *Arum*, *Coclearia*, banana, *Cassia*, *Cyperus esculentus*, eggplant, hemp, Guinea corn, maize, mandrake, millet, and rice. [See also *Bot. Absts.* 11, Entries 1031, 1032.]—*C. W. Dodge*.

1076. [WILDEMAN, E. DE.] Alfred Cogniaux (1841-1916). *Bull. Soc. Roy. Bot. Belgique* 54: 104-105. 1921.—This is a sketch of the life of A. Cogniaux, author of important monographs of Melastomaceae, Cucurbitaceae, and Orchidaceae.—*Henri Michels*.

1077. [WILDEMAN, E. DE.] Charles van Bambeke (1829-1918). *Bull. Soc. Roy. Bot. Belgique* 54: 105-106. 1921.—This is a biography of the founder of Archives de Biologie.—*Henri Michels*.

1078. [WILDEMAN, E. DE.] Le R. P. Paques (1850-1918). Bull. Soc. Roy. Bot. Belgique 54: 103-104. 1921.—This is a biographical sketch of E. Paques.—*Henri Micheels.*

1079. [WILDEMAN, E. DE.] Leon Coomans (1830-1916). Bull. Soc. Roy. Bot. Belgique 54: 106-107. 1921.—This is a brief sketch of the life of a charter member and treasurer of the Société Royale de Botanique de Belgique.—*Henri Micheels.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 1548, 1858, 1891)

1080. ANONYMOUS. Additions to gardens, 1920. Kew Bull. 1921: 34-38. 1921.

1081. ANONYMOUS. Arboretum. Kew Bull. 1920: 36-37. 1920.

1082. ANONYMOUS. Arboretum. Kew Bull. 1921: 38-39. 1921.

1083. ANONYMOUS. Museum. Kew Bull. 1920: 37-38. 1920.

1084. ANONYMOUS. [Rev. of: FURNEAUX, W. S. Countryside rambles. *Ivi* + 188 p. (New Era Library.) George Philip and Son: London (no date).] Nature 108: 207. 1921.

1085. ANONYMOUS. [Rev. of: SKENE, MACGREGOR. Common plants. 271 p., 24 pl. A. Melrose: London.] Jour. Bot. 59: 333-334. 1921.

1086. ANONYMOUS. [Rev. of: STORM, ASHLEY V., and KARY C. DAVIS. How to teach agriculture: a book of methods in this subject. *vii* + 434 p. J. B. Lippincott Co.: London, 1921.] Nature 108: 334. 1921.

1087. ANONYMOUS. The botanic gardens, Victoria, Cameroons Province, Nigeria. Nature 108: 377-378. 2 fig. 1921.—These gardens cover 200 acres, and are provided with good laboratory, herbarium, and museum buildings as well as a building which served as an agricultural school. The soil is fertile decomposed rock. The lower slopes of the Cameron mountain are covered by extensive plantations of cocoa, coffee, rubber, bananas, etc. The Victoria gardens could be the main center for research in West Africa.—*O. A. Stevens.*

1088. ASPINALL, A. E. Tropical agricultural college in the West Indies. Kew Bull. 1920: 81-96. 1920.—The function, nature, and location of the proposed agricultural college for the British West Indies are discussed.—*E. Mead Wilcox.*

1089. BEAN, W. J. The arboretum and pinetum at Bicton. Kew Bull. 1920: 268-275. 1920.—This consists of notes on the trees, chiefly Coniferae, in this famous old arboretum.—*E. Mead Wilcox.*

1090. B[EAN], W. J. The Journal of the Botanical Society of South Africa. Kew Bull. 1921: 351-352. 1921.—The National Botanic Gardens at Kirstenbosch near Cape Town are considered.—*E. Mead Wilcox.*

1091. CLUTE, W. N. Botany for beginners. Amer. Bot. 28: 15-20. 1922.—This is a discussion of the universal appeal of plants in the open.—*S. P. Nichols.*

1092. CLUTE, W. N. Plant names and their meanings VII. Liliaceae II. Amer. Bot. 27: 50-56. 1921.

1093. CLUTE, W. N. *Plant names and their meanings VIII. Liliaceae III.* Amer. Bot. 27: 88-95. 1921.

1094. CLUTE, W. N. *Plant names and their meanings X. Leguminosae II.* Amer. Bot. 28: 27-35. 1922.

1095. FERGUSON, J. A. *The Penn State demonstration forest.* Amer. Forestry 27: 760. fig. 1921.—The author describes a mechanical demonstration forest by which the different methods of cutting can be shown to students.—*Chas. H. Otis.*

1096. H., J. M. *Museums.* Kew Bull. 1921: 39. 1921.

1097. H., J. M. *Presentations to museums.* Kew Bull. 1921: 40-41, 344-345. 1921.

1098. HILL, A. W. *Tresco Abbey gardens, Scilly Isles.* Kew Bull. 1920: 170-174. 1920.—The botanic gardens of Tresco Abbey in the Scilly Isles and La Mortola in the Riviera contain many species from South Africa, New Zealand, Australia, and South America.—*E. Mead Wilcox.*

1099. JONES, D. H. *Elementary bacteriological instruction in our public and high schools.* Sci. Agric. 2: 64-66. 1921.—This discussion on what has been done in Ontario during the last 10 years includes a plea for further consideration in view of the fundamental importance of bacteriology in life.—*B. T. Dickson.*

1100. MACDANIELS, L. H. *The agave: food, drink, fuel, and shelter for Mexicans.* Cornhill Countryman 19: 103-105. 3 fig. 1922.—In this popular account of the cultivation and uses of the Agave in the region near the City of Mexico particular attention is given to the production of the drink pulque.—*L. H. MacDaniels.*

1101. R., A. B. [Rev. of: FITTING, HANS, LUDWIG JOST, HEINRICH SCHENCK, and GEORGE KARSTEN. *Strasburger's text-book of botany.* 5th English ed. revised with the 14th German ed., by W. H. LANG. xi + 799 p., 823 fig., in part colored. Macmillan & Co.: 1921.] Jour. Bot. 59: 356-357. 1921.

1102. ROSS, H. [Rev. of: GIESENHAGEN, K. *Lehrbuch der Botanik.* 8th ed. B. G. Teubner: Leipzig, 1920.] Forstwiss. Centralbl. 43: 234-235. 1921.—This is regarded as a most complete and excellent text book for the use of students, as well as a general reference book of botanical science. It is particularly well illustrated.—*W. N. Sparhawk.*

1103. TANSLEY, A. G. *British plants.* [Rev. of: BEVIS, J. F. and H. J. JEFFERY. *British plants: their biology and ecology.* xii + 346 p., 115 fig. Methuen: London, 1920.] Jour. Ecol. 9: 107. 1921.—The book is characterized as a creditable attempt to fill a gap in elementary botany. "It contains a fairly full bibliography of English books and papers. The plan of the book is well conceived but not so well carried out. The types of vegetation are, in general, treated too statically; there is in fact no treatment of succession. It lends itself rather too readily to getting up a knowledge of vegetation for examinations without any first-hand acquaintance with the subject in the field."—*Geo. D. Fuller.*

1104. TURRILL, W. B. *College botany.* [Rev. of: COOK, M. T. *College botany; structure, physiology and economics of plants.* J. B. Lippincott: 1920.] Kew Bull. 1921: 96. 1921.

1105. TURRILL, W. B. *The nature-study of plants.* [Rev. of: DYMES, T. A. *The nature-study of plants.* Kew Bull. 1920: 376-377. 1920.]

CYTOLOGY

G. M. SMITH, *Editor*GEO. S. BRYAN, *Assistant Editor*

(See in this issue Entries 1322, 1323, 1326, 1327, 1341, 1347, 1380, 1381, 1488, 1452, 1591, 1614, 1634, 1973)

ECOLOGY

H. C. COWLES, *Editor*GEO. D. FULLER, *Assistant Editor*

(See in this issue Entries 909, 910, 917, 962, 1071, 1072, 1075, 1103, 1155, 1179, 1195, 1206, 1210, 1237, 1267, 1276, 1282, 1369, 1433, 1476, 1511, 1590, 1597, 1598, 1610, 1619, 1626, 1628, 1630, 1635, 1642, 1644, 1856, 1950, 1986, 1988, 1989, 1992, 1999, 2018, 2023, 2049)

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 1095, 1733, 1883, 1957, 1964)

1106. ANONYMOUS. A typical stand of white pine in New England. Amer. Forestry 27: 787. 1 fig. 1921.

1107. ANONYMOUS. Baumhöhenmesser. [Tree hypsometers.] Deutsch. Forstzeitg. 36: 278. 1921.—The Christen hypsometer and the combination hypsometer and increment borer devised by Matthes are described.—W. N. Sparhawk.

1108. ANONYMOUS. California's piñon-nut industry. Sci. Amer. 125: 7, 15. 2 fig. 1921.—This is a popular article on *Pinus monophylla*.—Chas. H. Otis.

1109. ANONYMOUS. Das neue Kulturverfahren mit dem Dreiflügelpflanzstichel. [A new three-winged planting tool.] Deutsch. Forstzeitg. 36: 453-454. 1921.—This new tool for forest planting consists of a stout handle terminating in 3 heavy iron wedges radiating out from a center and so shaped that the center of the 3-armed hole made by thrusting it in the ground is higher than the ends of the arms. It is especially adapted for planting broad-rooted species, such as spruce.—W. N. Sparhawk.

1110. ANONYMOUS. Decay in pulp and pulpwood. Pulp and Paper Mag. 19: 781-784. 1921.—Tests using borax, boric acid, sodium dinitrophenolate, sodium dichromate, and sodium bicarbonate as preservatives are described. Sodium fluoride gave the best results, with borax a close second.—H. N. Lee.

1111. ANONYMOUS. Der Haushalt der Staatsforstverwaltung für das Rechnungsjahr 1921. [Budget of the (Prussian) state forest administration for the fiscal year 1921.] Deutsch. Forstzeitg. 36: 515-549. 1921.—Receipts are set at 1,269,797,000 marks, of which 1,200,000,000 marks are for 10 million cubic m. of wood and timber. This is only 1 million cubic m. more than the working plans call for, while in 1920 the cut was 5% greater than provided in the plans and receipts were considerably greater. The net income is estimated at 819,569,000 marks which is 510,416,000 marks less than in the 1920 budget, because of a large increase in expenditures and a considerable decrease in income.—W. N. Sparhawk.

1112. ANONYMOUS. Die Beeren- und Pilznutzung als Einnahmequelle für den Staat. [Berries and mushrooms as a source of revenue for the state.] Deutsch. Forstzeitg. 36: 333-334. 1921.—Charges for permits to gather berries and mushrooms on the state forests of Prussia were formerly only nominal. The value of these products has increased from 20 million marks in 1908 to more than 350 million marks in 1920. In 1 forest the revenue to the pickers from berries and mushrooms was greater than the state's revenue from sale of timber. Fees for permits have recently been increased.—W. N. Sparhawk.

1113. ANONYMOUS. Die neuen Jagdnutzungsvorschriften für die preussischen Staatsforsten. [New hunting regulations for Prussian state forests.] Deutsch. Forstzeitg. 36: 500-511, 527-529. 1921.—New regulations governing hunting on the state forests were adopted April 4, 1921. Changes from the 1919 regulations are described. Universal state control has been adopted, all receipts going to the treasury,—which bears all costs.—W. N. Sparhawk.

1114. ANONYMOUS. Drying wood in the Orient. Sci. Amer. 125: 43. 1 fig. 1921.

1115. ANONYMOUS. Eucalyptus bark as a cork substitute. [Rev. of: JANESON, F. W. Letter to the editor.] South African Jour. Indust. 4: 271. 1921.] Jour. Soc. Chem. Indust. 40: 235R. 1921.—Attention is called to the value of the bark of the gum tree (*Eucalyptus sideroxylon*) as an insulating material for refrigerating plants. The dry bark shows about the same insulating value as cork. At present it is a waste product.—G. B. Ray.

1116. ANONYMOUS. Experiments with pulp from Australian hard woods. Sci. Amer. 125: 270. 1921.—Brief results of experiments by the Forest Products Laboratory at Perth, West Australia, are given.—Chas. H. Otis.

1117. ANONYMOUS. Latex yield from individual rubber trees. Kew Bull. 1921: 349-351. 1921.—Great variation in the latex yield of individual trees is reported. This forms a basis for selection experiments. Tapping methods are discussed.—E. Mead Wilcox.

1118. ANONYMOUS. Loi: autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts. [A law: provisionally authorizing the government to prevent the excessive cutting of certain woods and of certain forests.] Bull. Soc. Centrale Forest. Belgique 28: 100-127, 170-192. 1921.—Provisional legislation, effective until Jan. 1, 1922, authorizes the Secretary of Agriculture to stop clear cutting of private broad leaved forests where injurious to the public interest from the esthetic, hygienic, or water supply points of view. No more than $\frac{1}{2}$ the volume of the standing timber may be removed. In private coniferous forests, where the public interest would be affected, no more than 25 hectares on any one property may be clear cut.—The discussion of the law in Parliament is given verbatim. The constitution of the country is cited as providing that no restrictions may be imposed on the free use of private property without compensation to the owner. Socialistic members favor the nationalization of forest properties.—W. C. Lowdermilk.

1119. ANONYMOUS. State foresters study blister rust damage. Amer. Forestry 27: 782, 794. 1 fig. 1921.—The annual meeting of the Association of State Foresters, held in New York State on Sept. 20-22, is briefly reported.—Chas. H. Otis.

1120. ANONYMOUS. Stigende interesse i skogbruget i de forenede stater. [Increasing interest in forestry in the United States.] Tidsskr. Skogbruk 29: 330-332. 1921.

1121. ANONYMOUS. The evolution of forestry in N. S. W. Australian Forest. Jour. 4: 130-132, 162-163, 196-198, 256-258, 288-290. 1921.—The history, development, and practice of forestry in New South Wales is briefly traced under the headings of retrospect, historical phases, financial features, practice and progress, education, training, and research.—C. F. Kortstan.

1122. ANONYMOUS. The lightest timber known: Balsa wood. Australian Forest Jour. 4: 313-314. 1921.—The properties and uses of the wood of the balsa tree, *Ochroma lagopus*, are discussed briefly.—C. F. Körstian.

1123. ANONYMOUS. The soap-nut tree—a last chance. Sci. Amer. 125: 145. 1921.—Mr. E. Moulie has devoted much effort to bring the soap-nut tree (*Sapindus Mukorossi*) into more general cultivation. On several occasions, after accumulating from his own plantation a supply of nuts, he has conducted free distribution of the seed, with great success. He again, perhaps for the last time, offers to send 10 tested seed to any applicant living in a locality suitable for the growth of the tree.—Chas. H. Otis.

1124. ANONYMOUS. The supply of pulpwood. Amer. Forestry 27: 757. 1921.—This is an editorial on the pulpwood supply of Canada.—Chas. H. Otis.

1125. ANONYMOUS. Thinnings. Indian Forest. 47: 453-459. 1 fig. 1921.—Studies made during the past 28 years show that thinnings in sal (*Shorea*) are necessary. The growth in a stand thinned in 1884 shows for trees 18-60 inches in girth an increment of 13.7 inches in girth against an increment of 7.5 inches in girth in the unthinned. The increment in thinning at Dehra Dun, rapid in the 1st 5 years, decreased in the 2nd 5 years, and was lost thereafter. The Eclairec par le Haut method will probably prove the best under Indian conditions.—E. N. Munns.

1126. ANONYMOUS. Water solubility a necessary property of wood preservatives. Sci. Amer. 124: 481. 1921.

1127. ANONYMOUS. Wert der Holzlieferung an die Entente. [Value of wood delivered to the Entente.] Deutsch. Forstzeitg. 36: 415. 1921.—To date (May, 1921) wood to the value of 397.3 million marks (based on prices fixed by the Allied Commission) had been delivered, 72.1 per cent to France, 8.7 per cent to Italy, and 19.2 per cent to Belgium. The value of sawed lumber was 211.4 million marks.—W. N. Sparhawk.

1128. ARCHER, ERLING. En skikkelig tømmerstok. [A well proportioned log.] Tidskr. Skogbruk 29: 259-281. Pl. 1, fig. 12. 1921.—Detailed measurements and comparisons of the dimensions, ages, and volumes of timber sent to the exposition at Christiania in 1915 from different parts of Norway are given. The tables and diagrams present this material for 3 qualities of site for Norway spruce and Scotch pine.—J. A. Larsen.

1129. AUBERT, F. Le commerce des bois en Suisse. [The timber trade in Switzerland.] Jour. Forest. Suisse 71: 129-136, 142-149. 1920.—The conclusions reiterate that Switzerland, deficient in timber, is interested in supplying its own timber needs. It is urged that local markets be stimulated by special freight tariffs based on value rather than on weight, and that the national timber industry be protected by a graduated customs rate corresponding with the value of the product.—W. C. Lowdermilk.

1130. BADOUX, H. Choses forestières dans le canton de Fribourg. [Forest affairs in the canton of Fribourg.] Jour. Forest. Suisse 72: 1-6. 1921.

1131. BADOUX, H. Coup d'oeil sur les produits des forêts aux États-Unis d' Amerique. [A survey of forest products of the United States of America.] Jour. Forest. Suisse 72: 22-27. 1921.

1132. BADOUX, H. Dégâts causés aux forêts suisses par le coup de fôhn du 5 janvier 1919. [Damages caused to the Swiss forests by the storm of January 5, 1919.] Jour. Forest. Suisse 71: 125-128. 1920.—The unusual storm of this date broke or uprooted fully 817,550 cubic m. of timber. The broad leaved species resisted wind damage better than the conifers. Among the latter larch (*Larix europaea*) was the most resistant and spruce (*Picea excelsa*) the least. The storm showed the mistake of establishing plantations of pure spruce.—W. C. Lowdermilk.

1133. BADOUX, H. Le grand if de Chillon. [The big yew of Chillon.] Jour. Forest. Suisse 72: 61-63. 1921.

1134. BADOUX, H. Le pin Weymouth (*Pinus Strobus*) en Suisse. [The eastern white pine (*Pinus Strobus*) in Switzerland.] Jour. Forest. Suisse 71: 222-227. 1920.—*Pinus Strobus* appears to have been introduced into Europe in 1705 by Lord Weymouth, who discovered the species in Canada. Of all exotic species it is best suited to European conditions. Near Rapperswil, Switzerland, is a small stand of 105 trees 116 years old. Unfortunately the white pine is subject to numerous enemies and in the last 20 years has suffered much from blister rust. A study of the species in its native habitat is made. (To be continued.)—W. C. Lowdermilk.

1135. BADOUX, H. Le pin Weymouth (*Pinus Strobus*) en Suisse (suite). [The eastern white pine (*Pinus Strobus*) in Switzerland (continued).] Jour. Forest. Suisse 72: 86-89. 1921.—The white pine has not been generally introduced into France although it is recommended for planting in the devastated regions because of its rapid growth and suitability for paper pulp. In Germany this species, introduced at an early date, has been widely planted. Numerous records and references are given to the characteristics in development and susceptibility to injury. The blister rust is causing apprehension for the future of the white pine in Europe.—W. C. Lowdermilk.

1136. BADOUX, H. Le pin Weymouth (*Pinus Strobus*) en Suisse (suite). [The eastern white pine (*Pinus Strobus*) in Switzerland (continued).] Jour. Forest. Suisse 72: 131-135. 1921.—The eastern white pine has made excellent growth generally in Switzerland, numerous forests containing plantations as much as 105 years old. This pine grows well on soils unfavorable for spruce (*Picea excelsa*) and on the worn out soils of nurseries. The largest stands are in the communal forests of Zofingue, comprising 3620 trees. The annual cut averages 300 cubic m. The oldest trees are 70 years, with a maximum diameter of 70 cm. and a maximum height of 34 m. Damage due to the honey fungus (*Agaricus mellicus*), root Trametes (*Trametes radiciperda*), and blister rust (*Cronartium ribicola*) is so far of little importance.—W. C. Lowdermilk.

1137. BAKER, F. S. Two races of aspen. Jour. Forestry 19: 412-413. 1921.—In Utah 2 races of aspen have been noted. One race leaves out sooner, retains leaves longer, and has a yellowish cast to the bark. There is little difference, if any, in growth.—E. N. Munns.

1138. BARBEY, A. Le chermes cortical du sapin blanc. [The bark chermes of the silver fir (*Abies pectinata*).] Jour. Forest. Suisse 72: 7-10. 1921.

1139. BARBEY, A. L'évolution forestière chez nos voisins de l'Ouest. [The progress of forestry of our western neighbors.] Jour. Forest. Suisse 71: 188-190. 1920.

1140. BATES, CARLOS G. First results in the streamflow experiment, Wagon Wheel Gap, Colorado. Jour. Forestry 19: 402-408. 1921.—One of 2 watersheds, observed for 10 years, has been denuded with the result that earlier melting of snow occurred with a higher rate of flood discharge during the flood period. During the summer the flow from the deforested area was greater than the forested because of the decreased leaf surface. The amount of measurable detritus carried by the stream increased 125 per cent with denudation.—E. N. Munns.

1141. BATES, JOHN S. Grinding tests of average, infected and sound pulpwood. Pulp and Paper Mag. 19: 687-688. 1921.—The methods used in experimental tests made on a commercial scale are described. Infected wood yields about 10 per cent less pulp than sound wood, but its oven-dry weight is 12 per cent less. The weight and yield of average wood is about midway between sound and infected wood. The quality of pulp from infected wood is poorer than that from sound or average wood.—H. N. Lee.

1142. BATES, JOHN S. **Groundwood preservation tests.** Pulp and Paper Mag. 19: 851-853. 1921.—Tests using zinc chloride, mercuric chloride, and sodium fluoride are described. Sodium fluoride gave best results.—*H. N. Lee.*

1143. BATES, JOHN S. **Sulphite tests of average wood, infected wood and chipper dust.** Pulp and Paper Mag. 19: 607-610. 1921.—Methods used in preparing and sampling wood and pulp in experimental tests made on a commercial scale are described. Infected wood yielded nearly as much and nearly as good pulp as average wood. Infected wood yielded satisfactory sulphite pulp if the decay had only discolored the wood and not reduced it to punk. Chipper sawdust was cooked but required special treatment and yielded short fiber.—*H. N. Lee.*

1144. BEAN, W. J. **Forests, woods and trees.** [Rev. of: HENRY, A. **Forests, woods, and trees in relation to hygiene.** 341 p., plates, maps. Constable & Co.: London, 1919. Kew Bull. 1920: 142-143. 1920.]

1145. BEAN, W. J. **Taiwania cryptomerioides Hayata.** Kew Bull. 1920: 72. 1920.—Notes are given on this coniferous tree from Formosa.—*E. Mead Wilcox.*

1146. BERTOG. **Zum Thema Dauerwald.** [Concerning the "permanent canopy forest."] Deutsch. Forstzeitg. 36: 575. 1921.—Bertog commends Reussner's suggestion of converting pine stands into 2-storyed mixed forests by underplanting thinned stands with spruce and hardwoods, and suggests that pine also be used for underplanting.—*W. N. Sparhawk.*

1147. BIOLLEY, H. **Considerations sur l'aménagement des forêts en Suisse.** [Considerations on the management of forests in Switzerland.] Jour. Forest. Suisse 71: 161-168. 1920.—The author, replying to a series of articles under the same title published in this journal in 1919, considers 4 points: the relation of management and treatment; current increment; the Heyer formula; and the concessions of Flury.—Management and treatment can not be disassociated; they must meet in the allocation and method of cutting. The formula methods of calculating increment are much less exact than the method of frequent inventories. The formulae are based upon inexact figures and the errors are not discernible. The current increment as determined by the inventories is the proper basis for control. The formula of Carl Heyer favored by Flury is based upon too infrequent inventories. Therefore, the mean annual increment is an uncertainty. In the inventories trees are not measured until they have reached the age equal to $\frac{1}{2}$ the rotation, and only $\frac{1}{2}$ the forest area is gone over. The mean annual growth is based upon the past history of the forest and may not be applicable to the future management of the forest. [See also Bot. Absts. 5, Entry 158; 9, Entry 131.]—*W. C. Lowdermilk.*

1148. BIOLLEY, H. **Considerations sur l'aménagement des forêts en Suisse.** [Considerations on the management of the forests in Switzerland.] Jour. Forest. Suisse 71: 185-187. 1920.—The precautions to be taken in the use of the Heyer formula do not safeguard the forest as it prevents meeting the vital demands of the stand by the fixation of periods and age classes. Flury agrees that with several inventories at short intervals the annual yield may be determined without the aid of formulae. Likewise by the use of the current increment for regulation it is unnecessary to know the age of the stand or the length of the rotation, except for cultural purposes.—*W. C. Lowdermilk.*

1149. BIOLLEY, H. **De la technicité de l'inventaire forestier.** [Concerning the technique of the inventory of forest stands.] Jour. Forest. Suisse 72: 121-127. 1921.—Inventory of the growing stock in forest stands has become, in addition to a volume-estimation, a study in current increment. Reliable results require the development of a high grade of technique in the measurement of trees. While this work may not be done with a micrometer, the inventory may not be dispensed with, and may be perfected sufficiently for the purpose.—*W. C. Lowdermilk.*

1150. BÖHMER, J. Blædning og gruppehugst med plantning. [Thinning, group cutting, and planting.] Tidsskr. Skogbruk 29: 248-252. 1921.

1151. BOODLE, L. A., and W. DALLIMORE. Bamboos and boring beetles. Kew Bull. 1920: 282-285. 1920.—Soaking in water, by removing much of the sugar, largely prevents borer injury to bambos used for building purposes.—*E. Mead Wilcox.*

1152. BRUCE, DONALD. Preliminary volume tables for second-growth redwood. California Agric. Exp. Sta. Bull. 334: 235-237. 1921.—The 1st table is based on merchantable height to 5 inches in the top and was prepared by the frustum form factor method. The 2nd, based on total height, was derived from the 1st by studying the average length of top above 5 inches for trees of various heights and diameters.—*A. R. C. Haas.*

1153. BRUCE, DONALD. The alignment chart method of preparing tree volume tables. Univ. California Publ. Agric. Sci. 4: 233-243. 1921.—The mathematics and development of the method are given in connection with illustrations.—*A. R. C. Haas.*

1154. CANDOT, E. Les ventes de bois en 1920. [Sales of wood in 1920.] Rev. Eaux et Forêts 59: 109-115. 1921.—Prices for timber, very high in 1919, continued to rise in 1920. Oak averaged 125 francs per cubic m. in the log in the Paris region, and in the forest of Bellême 1st quality oak rose from 200 francs in 1919 to 325 in 1920. Other species, both hardwoods and conifers, showed similar increases but with considerably lower maxima. Fuel wood dropped somewhat in price. The high prices for timber were due to depleted stocks, reduced imports, the anticipated renewal of economic activity, and the generally increased prices for all commodities resulting from a depreciated currency. Present high prices, though profitable for forest owners, hinder the reconstruction of the devastated zone and are likely to stimulate increased foreign and colonial imports.—*S. T. Dana.*

1155. CHAUDÉY, A. Météorologie et reboisements. [Meteorology and reforestation.] Rev. Eaux et Forêts 59: 239-249. 1921.—Practically all the streams rising in the Cévennes are subject to severe floods which frequently do tremendous damage. These floods are due primarily to the fact that during the summer the air overlying the comparatively exposed soil becomes superheated and consequently surcharged with water vapor, which in the autumn is suddenly precipitated by cold winds from the north. Sometimes this precipitation reaches 701 mm. in 24 hours, or more than the average annual precipitation in most of France. That lack of forest cover is largely responsible for this concentration of precipitation in the autumn is indicated by the fact that in the neighboring plateau of Lente and Vercors, where conditions are practically the same except that 38 per cent of the total area is forested as against 17 per cent in the Cévennes, the precipitation is much more evenly distributed throughout the summer. The forest, by preventing overheating of the soil and of the overlying strata of air, lowers the temperature and decreases the relative humidity, thus inducing more frequent precipitation. It also materially moderates the force of the wind and by checking evaporation prevents the sudden cooling of the atmosphere. Finally, it greatly reduces erosion and regulates run-off. Reforestation of the denuded slopes of the Cévennes to a point where 38-40 per cent of the total area is under forest cover would be the surest, most permanent, and least costly way to lessen if not entirely eliminate the present torrents. Moreover, by increasing precipitation during the summer months, it would improve cultivation and pasture. Hardy pines would undoubtedly have to be used in the 1st plantings, to be succeeded later by fir and beech.—*S. T. Dana.*

1156. CLARK, R. H., and H. I. ANDREWS. The tannin content of Pacific Coast conifers. Jour. Indust. and Eng. Chem. 13: 1026. 1921.—The tannin content of freshly cut western hemlock (*Tsuga heterophylla*) bark varies from 9 to 15.5 per cent, according to the month the sample is taken. The average for the 9 months investigated is 13 per cent. That of spruce (*Picea sitchensis*) varies correspondingly from 12 to 17.5 per cent with the season, and averages about 15.6 per cent.—*Henry Schmitz.*

1157. COPE, JOSHUA A. A dream come true: Maryland loblolly pine to the front. *Jour. Forestry* 19: 397-401. 1921.—On a 900 acre tract in Maryland a profit of \$35 an acre was made by cutting mature loblolly pine into lumber and the scrubby hardwoods into fuel. Complete data on the costs of the work were obtained.—*E. N. Murns.*

1158. CURTISS, CHARLES F. Forest parks and their relation to the rural community. *Rept. Iowa State Bd. Conservation* 1919: 191-192. 1919.—The creation of state and county parks for the purpose of conserving timber is urged.—*L. H. Pammel.*

1159. D[ALLIMORE], W. Identification of the economic woods of the United States. [Rev. of: RECORD, S. J. Identification of the economic woods of the United States, including a discussion of the structural and physical properties of wood. 157 p., illus. J. Wiley & Sons, New York, 1919.] *Kew Bull.* 1920: 75-76. 1920.

1160. D[ALLIMORE], W. Resinous exudations from branches of *Larix occidentalis*. *Kew Bull.* 1921: 345-346. 1 fig. 1921.—This is the 1st notice of resinous exudation from this species in Great Britain.—*E. Mead Wilcox.*

1161. D[ALLIMORE], W. Studies in French forestry. [Rev. of: WOOLSEY, T. S. Studies in French forestry. 550 p., illus. J. Wiley & Sons: New York, 1920.] *Kew Bull.* 1921: 255-256. 1921.

1162. D[ALLIMORE], W. The hardwoods of Australia and their economics. [Rev. of: BAKER, R. T. The hardwoods of Australia and their economics. xvi + 522 p., 881 pl. Sydney, 1919.] *Kew Bull.* 1920: 375-376. 1920.

1163. D[ALLIMORE], W. The silviculture of Indian trees. [Rev. of: TROUP, R. S. The silviculture of Indian trees. 3 vols., illus. Clarendon Press: Oxford, 1921.] *Kew Bull.* 1921: 286-287. 1921.

1164. DALLIMORE, W. The yellow pines of North America. *Kew Bull.* 1921: 330-331. 1921.—Ecological, forestry, and taxonomic notes are given on the following species: *Pinus cubensis*, *P. nitis*, *P. monticola*, *P. palustris*, *P. ponderosa*, *P. Strobus*, *P. taeda*, and *P. virginiana*.—*E. Mead Wilcox.*

1165. D[ALLIMORE], W. Trees for the Falkland Islands. *Kew Bull.* 1920: 377-378. 1920.—Notes are given on an attempt to reforest the Falkland Islands. Previous information on this subject appeared in *Kew Bull.* 1919: 209-217. 1919.—*E. Mead Wilcox.*

1166. DARDELLAY, J. Politique forestière fribourgeoise: achats et reboisements. [The forest policy of Fribourg: purchases and reforestation.] *Jour. Forest. Suisse* 72: 127-131. 1921.

1167. DEAM, CHAS. C. The Department of Conservation, State of Indiana, present and future. The Division of Forestry. *Proc. Indiana Acad. Sci.* 1919: 79-80. 1921.

1168. DOUGLASS, BENJAMIN WALLACE. The Indiana forest problem. *Proc. Indiana Acad. Sci.* 1919: 63-66. 4 photo. 1921.—In this discussion of forest conditions in Indiana the author concludes that if forest fires were prevented by enforcement of the anti-forest-fire laws, the forests would replace themselves.—*F. C. Anderson.*

1169. DRUMAUX, L. Note sur l'aménagement des peuplements résineux en Campine. [A note on the management of coniferous stands in Campine.] *Bull. Soc. Centrale Forest. Belgique* 28: 150-166. 1921.—A system of management for the pine forests of the lowlands of Belgium is outlined. To supply information on the 3 principal factors (area, age, and increment or volume), there are required: (1) a detailed and accurate map; (2) tables showing

each compartment and the age of its stand; and (3) the yield, which may be determined by a table showing the general plan of cutting. It is unnecessary and useless to plan the age of exploitation or predict the cutting more than 10 years in advance. A reserve is necessary to make the cutting plan flexible. A plan is also provided for secondary products, thinnings, etc.—*W. C. Loudermilk.*

1170. DUNN, S. T. Variability of the camphor-yield in *Cinnamomum camphora*. Kew Bull. 1921: 129-135. 1921.—Seed for planting should be taken from high-yielding trees. Climatic and soil factors affect the yield. Date of clipping affects the camphor content of trees.—*E. Mead Wilcox.*

1171. D[UNNS], W. French forests and forestry. [Rev. of: WOOLSEY, T. S. French forests and forestry, Tunisia, Algeria, Corsica. With a translation of the Algerian forest code of 1913. 238 p., illus. J. Wiley & Sons: New York, 1917.] Kew Bull. 1920: 143-144. 1920.

1172. EBERBACH. Dauerwaldwirtschaft. [Continuous forest management.] Zeitschr. Forst. u. Jagdw. 52: 543-566. 1920.—The author discusses the conclusions of Trebeljahr and Müller relating to Müller's new system of continuous management of pine, which is as flexible as the old system is inflexible. The latter, governed by rules of rotation, definite relation of age classes, intermediate and final cuttings, helped to place the German forests on a higher plane, and for the time served its purpose. Today, "service" as opposed to methodical arrangement is dominant. Highest service is possible only when the management is free to use all natural factors available in solving its problem. The work is concentrated on wood production. The new system is described and a formula given for calculating the soil value for the continuous management system, which disregards the factor of rotation. The question of logging is no more a problem than in selection forests. All that is required is cutting at the proper time and the education of woods workers. Healthy reproduction can withstand a certain amount of damage.—*J. Roeser.*

1173. ELLIS, L. MACINTOSH. Forestry in New Zealand. New Zealand Jour. Agric. 22: 87-89. 1921.

1174. EVERITT, JOHN S. Working plan for a communal forest for the town of Ithaca, New York. New York Agric. Exp. Sta. [Cornell] Bull. 404. 53-99. Fig. 18-31. 1921.

1175. FABRICIUS. Holz als Baustoff. [Wood as construction material.] Forstwiss. Centralbl. 43: 268-270. 1921.—Owing to the scarcity of iron and steel, wooden construction is increasing. Points in favor of wood are: greater resistance to chemical action, lighter weight, greater ease of working, non-conduction of heat and electricity, durability (when dry), and comparative non-inflammability (fair-sized beams resist heat sufficient to weaken iron girders, and when they burn less damage is done to the masonry than by collapse of steel girders). Recent investigations have shown how "built-up" construction can combine great strength with economy of material, making it possible to roof rooms up to 50 m. wide with wood (auditoriums, hangars, railway stations). It is stated that the 60-m. tall antennae supports at Munich are built of pitch pine, and were put up by 1 man without difficulty.—*W. N. Sparhawk.*

1176. FABRICIUS. [Rev. of: DITTMAR. Der Waldbau. (Silviculture.) 2nd ed., 285 p. Neumann: Neudamm, 1921.] Forstwiss. Centralbl. 43: 274-276. 1921.—Dittmar's book is intended as a guide for students and a handbook for private forest owners, and therefore is not highly technical. It is up-to-date, devoting considerable space to soils, natural reproduction, and thinnings, but is somewhat one-sided in that it is based mostly on conditions prevailing in the north German pine region. The lack of references and of illustrations is noted.—*W. N. Sparhawk.*

1177. FANKHAUSER, F. *Les terrasses comme moyen de défense contre les avalanches.* [Terraces as a means of protection against avalanches.] Jour. Forest. Suisse 71: 207-214. 1920.

1178. FISCHER, C. *Die Gewinnung der Eichenrinde in den Schälwaldungen im Rheingau.* [The harvesting of oak bark.] Deutsch. Forstztsitzg. 36: 307. 1921.—The methods of peeling, drying, and bundling the bark are described.—W. N. Sparhawk.

1179. FROMBLING. *Über Mischbestände.* [Concerning mixed stands.] Zeitschr. Forst. u. Jagdw. 52: 688-698. 1920.—Although pure even-aged forests have several advantages, especially in so far as order and administration are concerned, the disadvantages are becoming more pronounced with increased knowledge. Poor success with mixtures in the past was due to improper choice of species, of which the author gives a few examples. The best tree for mixtures is heech. *Quercus sessiliflora* and larch are perhaps the 2 most desirable associates of beech in mixture. Spruce may be grown with heech but tends to crowd the latter. Although *Q. sessiliflora* is little regarded at present as a nurse tree, its value for that purpose will eventually be appreciated. The silviculturist should realize that regeneration can best be accomplished under mixed stands.—J. Roeser.

1180. FULLER, GEORGE D. *Pennsylvania trees.* [Rev. of: ILLICK, J. S. *Pennsylvania trees.* 3rd ed., 235 p., 120 pl., 120 fig. Dept. Forestry Pennsylvania Bull. 11. 1919.] Bot. Gaz. 69: 359-360. 1920.—The reviewer regards this as one of the best of tree manuals, the fact that it reached a 3rd edition within 5 years being a striking tribute to its excellence.—H. C. Cowles.

1181. GASKILL, A. *The cutting of Christmas trees.* Amer. Forestry 27: 748. 1921.—The writer expresses his belief that Christmas trees may be had in abundance and more and better forests by stimulating Christmas-tree production rather than by attempting to curtail it.—Chas. H. Otis.

1182. GILL, WALTER. *Annual progress report upon state forest administration in South Australia for the year ended June 30th, 1921.* Ann. Prog. Rept. Woods and Forests Dept. South Australia 1920/21: 12 p., 12 fig., 3 maps. 1921.—This is the customary administrative report for the financial year. The work of the Department is briefly summarized under the following captions: Area of Forest Reserves and Plantations, Areas Enclosed for Planting Operations, General Account of the Year's Planting and other Forest Operations, Sheep Cases (crates), Purchase of Lands, Distribution of Trees, Analysis of Sales of Standing Pine Timber, Revenue and Expenditure, and Officers of the Department. The report includes detailed tabular statements of planting and survival of trees during the year, receipts and expenditures for the year, a comparative statement of revenue, expenditure, and legislative provision for the past 45 years, and lands purchased from loan under Act 102S/10 for purposes of afforestation.—C. F. Korstian.

1183. GILL, W. *Pinus insignis a profitable crop.* Australian Forest. Jour. 4: \$1-\$3. 1921.—The author estimates a net return of £200-£300 per acre in 35-40 years after due allowance is made for the cost of land, planting, and care of plantations, compounded at 4½ percent interest and the cost of exploitation.—C. F. Korstian.

1184. GOURDIE, H. A. *The propagation of forest trees.* New Zealand Jour. Agric. 22: 357-363. 1921.

1185. GRAFF, E. *A travers quelques boisés de la Plaine du Rhône.* [A survey of some plantations in the valley of the Rhône.] Jour. Forest. Suisse 72: 81-84, 103-105. 1921.

1186. GRIMME, CLEMENS. *Ueber die Ausnutzung der Carnaubawachspalme.* [Utilization of the carnauba wax palm.] Pharm. Zentralhalle 62: 249. 1921.—Practically all parts

of *Capernicia cerifera* Mart. (*Corypha cerifera* Virey, *C. cerifera* Arrudoda Camara, *Arrufaria cerifera* Macedo) can be utilized. The root is used in certain provinces of Brazil for syphilis, skin diseases, rheumatism, and as a diuretic. The trunk furnishes a very hard yellowish-red wood suitable for building. The leaves are used for covering roofs, and for making hats, mats, baskets, ropes, fishing nets, etc., and the leaf ribs for making brooms. The green leaves are used as fodder and the leaf buds as vegetables. The latter contain much starch and are, therefore, used in making sugar, wine, and vinegar, but chiefly for obtaining carnauba wax. The fruits are edible when green and the roasted seeds are used as a substitute for coffee. Detailed analyses of the different parts of the fruit, of the oil, and of the wax are given.—*H. Engelhardt.*

1187. H., A. Introducing exotic conifers to New South Wales: Notes of a trip of investigation to the United States and Europe. *Australian Forest. Jour.* 4: 160-161, 281-283, 323-327. 1921.—The writer describes forest conditions on the western slope of the Sierra Nevada Mountains, comparing them with the Southern Highlands of New South Wales, for which suitable conifers were sought.—*C. F. Korstian.*

1188. HANN, R. Erfahrungen mit Saumschlägen. [Experiences with strip-cuttings.] *Forstwiss. Centralbl.* 43: 237-239. 1921.—As a result of his experiences the author concludes that cutting in strips (30-40 m. wide) has certain advantages in stands in which composition or location renders the danger of windfall slight. He favors reforestation by planting 3-4-year-old, twice-transplanted spruce, spaced 1.5-2 m. each way, except when the cutting follows a seed year. Then it is better to see whether natural reproduction will suffice. Pine and larch will reproduce naturally. Clear cutting is not advised in case of wind or snow damage to the old stands between the strips unless more than half of the trees are so damaged that they must be removed.—*W. N. Sparhawk.*

1189. HARWOOD, E. H. Forestry at Oxford. *Gard. Chron.* 69: 286-287, 297. *Fig. 127-128, 133-134.* 1921.—The experimental tract known as Bagley Wood, the property of St. John's College and located about 3 miles from Oxford, consists mainly of oak with some ash, sweet chestnut, sycamore, horse-chestnut, beech, poplar, and alder. Previous experiments on the tract are referred to and rate of growth of 10 species of trees given. Of a total area of 415 acres, $\frac{1}{3}$ will be gradually devoted to coniferous species. The greater part of these will be grown under financial rotation for the benefit of St. John's College, but some plots will be retained for a larger rotation for experimental purposes. The principal species grown will be larch, Douglas fir, Sitka spruce, Scotch and Corsican pine. The remaining quarter of the area will be reserved for broad leaved species, distributed in blocks for fire protection and encouragement of bird life to keep down insect pests.—*P. L. Ricker.*

1190. HAWLEY, L. F. The production of artificially dense charcoal. *Jour. Indust. and Eng. Chem.* 13: 301-302. 1921.—By distilling fine sawdust under pressure of 15 tons per square inch and above, a dense charcoal comparing favorably with coconut charcoal was produced.—*Henry Schmitz.*

1191. HENRY, A. Forest trees and shrubs of Hungary. [Rev. of: FEKETE, L., und T. BLATTNY. Die Verbreitung der forstlichwichtigen Bäume und Sträucher im Ungarischen Staate. [The distribution of the important forest trees and shrubs in Hungary.] 2 vols. 1913.] *Kew Bull.* 1921: 287. 1921.

1192. HICKEL, R. [Rev. of: HENRY, AUG. Forests, woods, and trees in their relation to hygiene. 314 p., pl., maps. Constable & Co., Ltd.: London, 1919.] *Rev. Eaux et Forêts* 59: 19-22. 1921.

1193. HICKEL, R. [Rev. of: RAFN, JOHANNES. The testing of forest seeds during 25 years, 1887-1912. 91 p., illus. Printed for private circulation: Copenhagen, 1915.] *Rev. Eaux et Forêts* 59: 43-45. 1921.

1194. HILL, FREDERICK TREVOR. *La France forestière victorieuse.* [French forestry victorious.] [Rev. of: WOOLSEY, THEODORE S., JR. *Studies in French forestry.* 550 p., 21 pl. John Wiley & Sons: New York, 1920.] *Rev. Eaux et Forêts* 59: 250-252. 1921.—Col. Woolsey's book should be read by the directing class in America. It is indispensable to foresters and historians and of great interest to the general reader.—*S. T. Dana.*

1195. HOLE, R. S. *The regeneration of sal (Shorea robusta) forests.* *Indian Forest Rec.* 8: 163-227. 8 pl. 1921.—The ecological character of sal regeneration has been studied since 1909 and a series of experiments has been carried on. Seed of the sal has been found very susceptible to injury through drought or through long immersion in water, but, by using great care, it may be kept a month in storage. Buried seed do better than those scattered on the surface of the ground. At least 6 seeds to the square foot are necessary to secure a stand. Too heavy shade is injurious to young plants, but some shade in the late afternoon is desirable. A surface covering of large dead leaves causes the radicles to shrivel for lack of moisture. Heavier layers of this litter cause a condition ascribed to bad soil aeration, i. e., the root growth is slight, and that of aerial parts is slow. Loosening the soil quickly remedies this. Burning surface litter improves germination, but, though not reducing the number of seedlings, it seems to reduce height growth.—Soil composition has little effect on the growth of sal seedlings, but in its relationship to moisture conditions is very important. It was found that when the water content fell below 3 per cent in sand or sandy loam, or below 10 per cent in loam, the seedlings died back; and during the very dry season the sprouts died back even when several years old.—In field practice, the best regeneration is obtained from clearings, the width of the clearing being the height of the adjacent stand, the clearing proceeding from east to west to give afternoon shade. Narrow clearings are necessary to avoid frost damage and the growth of weeds. Under partial shade weeds are kept down, but at the expense of growth. Some weeding is necessary to reduce the drain on soil moisture and to keep down a rank growth which at first chokes the trees. The height of the trees varies greatly with growing conditions. Under irrigation and without competition, a growth of 32 inches a year has been secured. Elsewhere the yearly growth is from 8.6 to 11.5 inches.—*E. N. Munn.*

1196. HOLLAND, J. H. *Brazil wood.* *Kew Bull.* 1920: 79-80. 1920.—Notes are given on *Haematoxylon brasiletto* Karsten, known as Brazil wood, peach wood, Lima wood, Nicaragua wood or wood of St. Martha. This was an important article of commerce a century ago.—*E. Mead Wilcox.*

1197. HOLLAND, J. H. *The west African oil palm (*Elaeis guineensis* Jacq.).* *Kew Bull.* 1920: 199-205. 1920.—Notes are given on the culture and oil production of the oil palm, of which the following varieties are recognized: *Elaeis guineensis macrospurma*, *microspurma*, and *repanda*.—*E. Mead Wilcox.*

1198. HUMMEL, C. *Note on the development of the wild mahogany and pine forests of British Honduras.* *Agric. News [Barbados]* 20: 134-135. 1921.—The author claims that the wild mahogany forests of British Honduras are sub-normally stocked because the parent trees of the best species are periodically removed while the reproduction of useless ones is unchecked. He urges more intelligent management and the removal of useless trees which overshadow the mahogany. In the pine forests, although natural production is fairly good, great destruction is caused every year by fire.—*J. S. Dash.*

1199. HUNZIKER, W. *L'ablation des bourgeons terminaux du sapin par le clempagnotroux (*Hypodeus glareolus*, Wgn.).* [The wasting of the terminal buds of the silver fir (*Abies pectinata*) by *Hypodeus glareolus*.] [A translation of: W. HUNZIKER (see Bot. Absts. 9. Entry 166.) *Jour. Forest Suisse* 72: 89-92. 1921.]

1200. ILLICK, J. S. *What our Christmas trees are.* *Amer. Forestry* 27: 740-747. 1921.—This popular description of the numerous coniferous trees and forest products used at Christmas time includes notes on their production.—*Chas. H. Otis.*

1201. KAASA, J. A. Sneskytten (*Phacidium infestans*) og dens betydning for furuforsyningen. [*Phacidium infestans* and its bearing on pine reproduction.] *Tidsskr. Skogbruk* 29: 281-284. 1921.

1202. KANEHIRA, R. Detection of flavone and the fluorescence of the watery extract of woods as aids in identification. *Jour. Forestry* 19: 736-739. *Fig. 1.* 1921.—The study of the wood of 69 American tree species shows that the watery extract of the woods gives a clue to their identification. Coloration is often slight and the determination of the flavone content is difficult. The fluorescence of the watery extract of many species must be determined with the camera.—*E. N. Munns.*

1203. KAURIN, W. Sønderjylland. [South Jutland, Denmark.] *Tidsskr. Skogbruk* 29: 325-330. 1921.—Notes on climate, forest areas, forest management, and forest plantations in southern Jutland, Denmark, are given.—*J. A. Larsen.*

1204. KEENAN, T. J. New sources of pulp and paper. *Sci. Amer.* 124: 469, 479-480. 1921.

1205. KELLER, C. Production de manne dans les forêts de mélèze du Valais. [Production of manna in the larch forests of Valais.] *Jour. Forest. Suisse* 71: 181-183. 1920.

1206. KIRK, H. B. On growth-periods of New Zealand trees, especially *Nothofagus fusca* and the Totara (*Podocarpus totara*). *Trans. and Proc. New Zealand Inst.* 53: 429-432. 1921.—The writer considers that these trees show a definite period of increasing diameter growth-rate until their prime is reached, when there is a decrease in the growth-rate. For *Podocarpus totara* the maximum rate was reached during the 200-250 year period, and for *Nothofagus* during the 50-100 year period.—*Wm. Randolph Taylor.*

1207. KÖNIG, Baumhöhenmesser. [A hypsometer.] *Deutsch. Forstzeitg.* 36: 493-494, 496. 1921.—König describes a simple home-made hypsometer, which he says is as satisfactory for most work as the most expensive commercial ones. It is based on the principle of similar triangles, and does not require measuring the distance from observer to tree.—*W. N. Sparhawk.*

1208. KRESS, OTTO. Progress in study of wood and wood pulp infection and decay. *Paper Industry* 2: 1543-1547. 1921.—Methods of piling wood and wood pulp to prevent decay are discussed, and the chemical composition of sound, partly decayed, and badly decayed spruce wood is given.—*H. N. Lee.*

1209. L., C. N. La sylviculture en Campine. [Silviculture in Campine.] *Bull. Soc. Centrale Forest. Belgique* 28: 167-170. 1921.—Scotch pine (*Pinus sylvestris*) is the species best suited to the lowlands of western Belgium, but numerous other species have been tested. Among the exotics, Douglas fir (*Pseudotsuga taxifolia*) has made the best development, and its wood is superior to that of Scotch pine. The western cedar (*Thuya gigantea*) also grows well. The varying success of other species is indicated.—*W. C. Lordermill.*

1210. LACAITA, C. C. Quercus aegilops. *Kew Bull.* 1920: 100-105. 1920.—The history and distribution of the Vallonea, oak of Greece and the Levant are discussed.—*E. Mead W. Geor.*

1211. LIE, HAAKON. De goede gamle dage. [The good old days.] *Tidsskr. Skogbruk* 29: 322-330. *Pl. 1.* 1921.—This short story points out certain conditions under which the men worked and got timber in the mountains in days past.—*J. A. Larsen.*

1212. LÖCKEN, RAGNAR. Skogplantning i Norge. [Forest planting in Norway.] *Tidsskr. Skogbruk* 29: 297-307. 1921.

1213. LOVELL, J. H. Fir sugar again. Amer. Bee Jour. 61: 263. 1921.

1214. LÖVENSKJÖLD, CARL. En del plantefelter i Rogaland fylke. [Some plantations in Rogaland County, Norway.] Tidsskr. Skogbruk 29: 231-248. Pl. 18. 1921.

1215. LÖVENSKJÖLD, CARL. Plantninger og naturskog paa vestlandet. [Plantations and natural forests on the west coast, Norway.] Tidsskr. Skogbruk 29: 317-325. Pl. 7. 1921.—This and several other recent articles bearing on this subject contain valuable information for experimenters in artificial reforestation. The plantations range in age up to 40 years. The problem is to find suitable species and the best developed stock for reclaiming shallow soil over-lying flat glaciated rock, for thin gravelly soil, for wind-swept sandy areas near the coast, and for dry upland with a wealth of deep-rooted evergreen vegetation.—*J. A. Larson*.

1216. LUZE, J. J. DE. Traitemen et aménagement (lettre ouverte à MM. Biolley et Flury. [Treatment and management (an open letter to Messrs. Biolley and Flury).] Jour. Forest. Suisse 71: 202-206. 1920.—The selection method of H. Biolley is agreed to, but the period of taking inventories should be not less than 10 years. On the other hand the formula method of calculating the annual yield is considered obsolete and impracticable. The 3 important facts are the forest area, the standing material, and a very close approximation of the current increment. For the 1st decade a percentage, for example, of 2 per cent may be taken as representing the annual yield. But after the 1st revision the current growth may be exactly known.—*W. C. Lowdermilk*.

1217. LUZE, J. J. DE. Un mode d'application original en matière d'éclaircies. [A method of conducting thinnings.] Jour. Forest. Suisse 72: 101-103. 1921.

1218. LUZE, J. J. DE. Une révision d'aménagement intéressante. [A revision of an interesting working plan.] Jour. Forest. Suisse 71: 227-231. 1920.

1219. MACBRIDE, T. H. Forestry notes on Pilot Mound. Rept. Iowa State Bd. Conservation 1919: 126-127. 1919.—This is an account of the forest trees of the region, which were covered with trees now for the most part removed, should be reforested.—*L. H. Pammel*.

1220. MACBRIDE, T. H. Forests and their relation to stream flow. Rept. Iowa State Bd. Conservation 1919: 195-200. 1919.—The author urges preservation of forests to prevent streams from filling up streams and rivers. Second growth thicket is a good preserver of moisture.—*L. H. Pammel*.

1221. MACDONALD, G. B. Forest parks in Iowa. Rept. Iowa State Bd. Conservation 1919: 192-195. 1919.—In this discussion of the value of forests in Iowa the author urges that idle unproductive lands be reforested. There is danger of the white pine becoming extinct.—*L. H. Pammel*.

1222. MACDONALD, G. B. Report on conference of foresters at Atlantic City, Nov. 12-13, 1920. Rept. Iowa State Hort. Soc. 55: 27-30. 1920.—An account is given of timber resources of the U. S. A. and the necessity of reforestation.—*L. H. Pammel*.

1223. MAERKER. Zur Kiefern-Dauerwaldwirtschaft des Herrn von Kalitsch auf Bärenthoren. [Concerning Kalitsch's continuous management in pine in Bärenthoren.] Zeitschr. Forst- u. Jagdw. 52: 595-604. 1920.—Advantages of the Bärenthoren system, aside from its favorable effect on the soil, are: it protects against heavy late frosts, reduces damage by game, and removes only material which is economically mature or which is no longer growing. Increased production is possible and a higher grade of material may be secured. The increased cost of harvesting the crop is offset by the lesser cost of securing reproduction naturally. The system has solved the problems of (1) which material to remove (*i. e.*, that which is no longer increasing in volume and value, and of which the removal will further the development;

the remainder), and (2) regulating the amount of material removed so that the growing stock and its value will be increased. Adoption of this system means eliminating the old yield regulations and the distinction between final and intermediate yields.—*J. Roeser.*

1224. MARTLEY, J. F. Double cross grain. *Ann. Appl. Biol.* 7: 224-268. 1920.—This paper covers a study in the nature of double cross grain in wood from various Indian trees. It was found that: (1) the character of the double cross grain of the different Indian woods examined is remarkably uniform; (2) different types of growth cause transitional types of grain between straight grain and full development of double cross grain; (3) there was no correlation between seasonal changes; (4) fibre measurements of *Calophyllum* sp. and *Chloroxylon Swietenia* suggest that a longer fibre length is correlated with inclined grain and a shorter fibre length with straight grain. Tables, charts, and photographs are given.—*L. W. Melander.*

1225. MATHEY, ALPH. Choses d'Amérique. [American affairs.] [Rev. of: DANA, SAMUEL T. Forestry and community development. U. S. Dept. Agric. Bull. 638. 35 p., 3 pl. 1918.] *Rev. Eaux et Forêts* 59: 269-270. *Pl. I-4.* 1921.

1226. MOORE, BARRINGTON. [Rev. of: McDougall, D. T. Growth in trees. Carnegie Inst. Washington Publ. 307. 41 p., illus. 1921.] *Jour. Forestry* 19: 692-693. 1921.

1227. MORBECK, GEORGE C. Possibilities of forestry in Iowa, and discussion. *Rept. Iowa State Hort. Soc.* 55: 64-70. 1920.—The author estimates the original stand of timber in the U. S. A. at 5200 billion feet. At present the stand east of the great plain is 2214 billion feet, 178 million feet being on farms. In the future the farmer's wood lot will play an important part in timber supply. After giving statistics on wood consumption in Iowa, the author suggests putting available forest soil to work.—*L. H. Pammel.*

1228. MULFORD, F. L. Berry-bearing plants. *Amer. Forestry* 27: 761-767. 18 fig. 1921.

1229. NEWTON, CHARLES D. State regulation of cuttings on privately owned lands. *Jour. Forestry* 19: 707-717. 1921.—The Attorney General of New York ruled that State regulation of cutting is possible under the police powers of the commonwealth when the cutting is of possible danger to watersheds.—*E. N. Munns.*

1230. NICHOLS, GEORGE E. [Rev. of: DEAM, C. C. Trees of Indiana. 1st rev. ed., 22 p., 137 pl. Dept. of Conservation State of Indiana Publ. 13. April, 1921.] *Science* 55: 20. 1922.

1231. OBERDIECK. Dauerwaldwirtschaft. [Continuous forest management.] *Zeitschr. Forst- u. Jagdw.* 52: 478-485. 1920.—The author, comparing his experiences of 15 years with those of Möller, who reported on the Bärenthoren continuous forest management in *Pinus sylvestris* [see Bot. Absts. 9, Entry 186], objects to some of Möller's conclusions. Among others, he discusses seed cuttings in pine, the system of continuous thinnings and cuttings practiced under his administration, and the 2-story high-forest form adopted in mixed stands of 50-70-year old pine spruce.—*J. Roeser.*

1232. OLBERT. Stumpfensprengungsversuche der Forstabteilung der Landwirtschaftsamt Schlesien. [Stump-blasting experiments in Silesia.] *Deutsch. Forstzeitg.* 36: 530-537. 1921.—A brief note gives the results of blasting stumps with 15 different explosives. The costs ranging from 13.28 to 63.82 marks per cubic m. The cheapest and most effective material was a combination ammonal explosive.—*W. N. Sparkhawk.*

1233. PACK, A. N. England's new forest policy. *Amer. Forestry* 27: 731-734, 794. 9 fig. 21.

1234. PARKIN, J. *Eucommia ulmoides*. The tu-chung of the Chinese. Kew Bull. 1921: 177-185. 1921.—Cultural and economic notes on this tree, long cultivated in central and western China for its reputed medicinal properties, are given. Its bark contains a gutta-percha-like substance, which is present in a dry state as in the case of *Parthenium argentatum*, the source of guayule rubber, and *Chrysanthemus naucosus*, rabbit bush, another possible American source of rubber. The low yield of the bark and the mechanical difficulty of extraction are important elements to be considered.—E. Mead Wilcox.

1235. PD. Waldschutz durch Vogelschutz. [Protecting forests by protecting birds.] Deutsch. Forstzeitg. 36: 731. 1921.—Large areas of beech forest north of Eisenach have been entirely defoliated by the caterpillars of *Dasychira pudibunda*, whereas the Seebach forest, a bird refuge, has almost entirely escaped damage, because before the butterflies laid eggs they were eaten by birds.—W. N. Sparhawk.

1236. PEMBERTON, C. C. Overgrowth of stumps of conifers. Canadian Field Nat. 35: 81-87. 4/9. 1921.—By excavating roots and rootlets in cut-over forests the author confirms a former opinion that the overgrowth of certain coniferous stumps takes place only when the roots of the stump are in part grafted to the roots of a foster tree. If the overgrowth is cut off a renewed healing takes place.—W. H. Emig.

1237. PERRY, WALTER J. Some observations on the relation of soil moisture to height growth in yellow pine saplings. Jour. Forestry 19: 752-753. 1921.—It is believed that the great increase in height growth of yellow pine made in 1920 is due to heavy rains, though data on rainfall are lacking. The location of the study is not given. J. N. Munns.

1238. PETRASCHIK, KARL. Hebung der Leistung bei der Holzbringung mit dem Fuhrschlitten durch Verbesserung der Schneebahn. [Increasing efficiency in sled-hauling timber by improving the snow-roads.] Forstwiss. Centralbl. 43: 241-249. 1921.—Methods of preparing and icing snow-roads for hauling logs, as practiced in the Austrian Tyrol and in the Great Lakes region of North America, are described.—W. N. Sparhawk.

1239. PILlichody, A. De l'art de marquer une coupe. [On the art of marking timber.] Jour. Forest. Suisse 71: 121-125. 1920.

1240. PILlichody, A. Des reseaux de chemins forestiers. [Systems of forest roads.] Jour. Forest. Suisse 72: 63-67. 1921.

1241. PILlichody, A. La foret de Derborence [The forest of Deborence.] Jour. Forest. Suisse 71: 141-142. 1920.

1242. PILlichody, A. Un massif forestier dans le Jura à 1700 m. d' altitude. [A forest area in the Jura at an altitude of 1700 meters.] Jour. Forest. Suisse 72: 42-46. 1921.

1243. PILlichody, H. Un peuplement d' aune noir traité en têtards. [A stand of black alder treated by pollarding.] Jour. Forest. Suisse 71: 231-233. 1920.

1244. POSKIN, A. Boisements par semis ou par plantation. [Reforestation by seeding or by planting.] Bull. Soc. Centrale Forest. Belgique 28: 98-105. 1921.—In the past 50 years re- and afforestation with Scotch pine (*Pinus sylvestris*) have changed from broadcast direct seeding to planting. Spruce (*Picea excelsa*) is not adaptable to direct seeding. Planting is considered more certain, more expeditious, and frequently more economical. In broadcast seeding the seedlings were often too crowded or too scattered. Changed conditions since 1914 have required, because of the excessive cost of plants and labor, a reconsideration of the problem. The price of seed is practically the controlling factor. The chief objection to direct seeding is the generally irregular result. It is necessary to sow 6-8 kgm. of seed per hectare.

(150,000 seed per kilogram) as there is only about 70 per cent germination and 4 per cent survival. Drilling in lines with a small mechanical seed drill is proposed to overcome the disadvantages of broadcast seeding and the cost in planting. The comparative costs are: planting, 198 francs per hectare; broadcast seeding, 200 francs per hectare; seed drilling, 150.75 francs per hectare. Costs of broadcast seeding and of planting are practically equal, due to the high price of seed. The drilling of seed in rows with a hand drill apparently promises satisfactory results at a lower figure.—In the flat country of Belgium the cultivation of land for field crops previous to sowing tree seed, or the preparation of the ground with tractor plowing, is advocated to secure the best results. In more mountainous regions the problem is more difficult.—*W. C. Loudermilk.*

1245. RIECKNAGEL, A. B. [Rev. of: ANONYMOUS. Rate of growth of conifers in the British Isles. Forestry Commission Bull. 3. 86 p., diagr. London, 1920.] *Jour. Forestry* 19: 684-692. 1921.

1246. RIECKNAGEL, A. B. [Rev. of: DUNLAP, FREDERICK. Growth of oaks in the Ozarks. Missouri Agric. Exp. Sta. Res. Bull. 41. 28 p., diagr. 1921.] *Jour. Forestry* 19: 793-794. 1921.—A calculation of the current annual increment based on the data given shows a close relationship which should have been given in the original text. The work is chiefly that of Professor Pegg.—*E. N. Munn.*

1247. RIECKNAGEL, A. B. [Rev. of: OXHOLM, AXEL H. Forest resources, lumber industry, and lumber export trade of Finland. U. S. Dept. Commerce Special Agents Series Bull. 207. 144 p., illus., maps. 1921.] *Jour. Forestry* 19: 667-678. 1921.

1248. RECORD, S. J. Japanese veneer paper. *Sci. Amer.* 125: 149. 1921.—The author describes the simple and ingenious process by which Kiri-gami or Kiri-kyogi-gami is manufactured from *Paulownia*.—*Chas. H. Otis.*

1249. REISS. Natürliche und künstliche Bestandsverjüngung. [Natural and artificial reproduction of forests.] *Forstwiss. Centralbl.* 43: 201-219. 1921.—Several new systems of silviculture proposed within the last few years include the selection border-cutting (Plentersaumschlag) of Wagger, the method used by Eberhard at Langenbrandt, the Eberbach method, and the so-called pine "continuous forest" form (Dauerwald) of von Kalisch. All depend on natural reproduction, and eliminate clear-cutting. None of these methods has found much favor outside the localities in which they originated, although their authors have claimed great results for them as contrasted with the old and still generally used method of clear-cutting followed by artificial reproduction. Reiss, after more than 50 years' experience, explains why he believes that natural reproduction methods will not give as good results in pine, and even in oak, forests as clear-cutting and planting, except possibly under very special circumstance. He does not question the use of natural reproduction in silver stands.—*W. N. Sparhawk.*

1250. REUSSNER. Zum Thema Dauerwald. [Concerning the "permanent canopy forest."] *Deutsch. Forstzeitg.* 36: 536. 1921.—In Saxony the great demand for timber and especially for fuel-wood, is causing overcutting and may result in reducing rotation to such a point that large timbers will be scarce. This may be remedied in pine forests by cutting about $\frac{1}{2}$ of the volume for mine timbers and fuel at about half the rotation age, and underplanting with spruce, beech, and oak. The remaining pine trees should be left until this underwood is ready to cut, and should then be taken out along with the spruce. The oak and beech should be left as shelter for the new crop, because they require a longer rotation. In this way a mixed forest of several age-classes is maintained, and some timber of large size is produced.—*W. N. Sparhawk.*

1251. ROBBINS, C. R. The swing of the pendulum - a description of Duchanfour's method. *Indian Forest.* 47: 443-452. 1921.—The Duchanfour method of forest regulation gives the

forester more freedom in developing the working plan. Only the period of regeneration is fixed, and that only for the revision period. Normally this block is fixed at $\frac{1}{4}$ of the whole area, and the forest officer thus has usually nearly $\frac{1}{4}$ of his area to make regeneration fellings in. Fixed limits are placed on the cutting amount, but there is ample freedom in cultural operations.—*E. N. Manns.*

1252. ROSENMANN. Vorbeuge vor Waldbrand-schäden. [Prevention of forest fire damage.] Deutsch. Forstzeitg. 36: 448-449. 1921.—The forest fire risk in Germany has increased considerably in recent years, due chiefly to the enormous consumption of cigarettes. Another frequent cause of fires is the woods-workers' habit of building fires in or close to thickets of young growth. Fires in such places should be forbidden, and every forest tract should be insured against fire.—*W. N. Sparhawk.*

1253. ROTHEKEGEL, W. Kritische Betrachtungen zur Bodenreinertrags- und Waldreinertragslehre. [A critical contemplation of the soil expectation and forest expectation value theories.] Zeitschr. Forst- u. Jagdw. 52: 457-477. 1920.—The author, discussing both theories, attacks the principles upon which the soil rental value theory, the so-called "addition" theory (Zurechnungs-Theorie), is based. He emphasizes the impossibility of calculating for a standing forest a separate yield-producing value for the soil and for the wood, or to divide the yield between the soil and wood supply. There is difficulty in applying the König-Fanstman (soil rental) formula because of selecting the interest rate. Difficulties are also encountered in applying the forest expectation value formula, but the theory of highest interest on capital value of soil and forest provides the best expression for the utilities which the forest provides its owners.—*J. Roeser.*

1254. ROWLEE, W. W. Tropical trees with light-weight wood. Jour. New York Bot. Gard. 22: 75-78. 1921.—Trees with light wood, which are confined to the tropical rain forest region and the belt of equatorial calms, are characterized by white or light-colored wood, thick fibrous bark, and extensive leaf surface, and belong to several different families. *Ochroma*, *Cavanillesia*, and *Jacarata* are especially discussed.—*H. A. Gleason.*

1255. SALLER. Das Waldbahnfördersystem Widegren. [Widegren's forest tramway system.] Forstwiss. Centralbl. 43: 270-273. 1921.—The construction and operation of a wooden tramway are described. This answers the purpose as well as, and is cheaper than, an iron railway for hauling logs and is more economical than sled-hauling with horses where roads are poor or where snowfall is light. It is practicable only near a forest where plenty of cheap wood of the right sort is available.—*W. N. Sparhawk.*

1256. SCH. Harzprodukte aus Kiefernstockholz. [Resin production from pine stumps.] Deutsch. Forstzeitg. 36: 372-373. 1921.—Because the cost of transportation makes unprofitable large-scale operations for extracting turpentine from stumps, Kienitz proposes small-scale establishments patterned after the Russian practice. Two kilns are used, in the 1st of which the turpentine and tar are driven off, and in the 2nd the wood is reduced to charcoal.—*W. N. Sparhawk.*

1257. SCHMITZ, HENRY. A possible explanation of certain forest fires of unknown origin. Jour. Forestry 19: 769-770. 1921.

1258. SCHWAPPACH. Versuch über die Entstehung von Waldbränden. [Investigations of the origin of forest fires.] Deutsch. Forstzeitg. 36: 670. 1921.—Investigations carried on by Reinhardt, 1903-1913 and 1918-1920, indicate that fires are not caused by burning cigar stubs, pipe ashes, or glowing matches, but can start only when the match or cinder is burning with a flame. Still or slowly moving air is most favorable for start of fires, but high winds cause them to spread.—*W. N. Sparhawk.*

1259. SHEPARD, WARD. Determining the height of a lookout tower. *Jour. Forestry* 19: 767-768. *Fig. 1.* 1921.—By plotting the slope of the mountain and the heights of the trees down this slope, a line drawn through the maximum tree heights extended to the peak determines the height of the lookout tower.—*E. N. Muens.*

1260. SHEPARD, WARD. Science versus tradition in game protection. *Jour. Forestry* 19: 408-411. 1921.

1261. SHERMAN, E. A. A plan for the disposal of Indian reservation timberlands. *Jour. Forestry* 19: 354-366. 1921.—Because of their value as protectors of the headwaters of streams, the Indian forest lands should be handled in accord with best forestry practice. Part of the lands should be set aside for permanent forest, and the balance bought by the Government from the Indians and properly managed.—*E. N. Muens.*

1262. SMITT, ANTON. Beretning om en Forstlig Studiereise til Nord-Amerikas Stillehavskyst. [Trip made to the Pacific Coast of North America for the purpose of studying forest conditions.] *Vestlandets Forst. Forskessat., Meddel.* 5. 142 p., 74 fig. Bergen, 1921.—The author briefly describes topography and climate and devotes the major portion of the report to the individual species, stating their ranges, requirements, rate of growth, quality of lumber, etc. There are numerous graphs comparing climatic conditions of the region with those of Norway. Smitt recommends for trial in Norway, in order of their importance: Douglas fir, Sitka spruce, western hemlock, western larch, Lodgepole pine, western red cedar, Sitka cypress, lowland grand fir, alpine fir, and western yellow pine. He hesitates to recommend western white pine on account of the danger from *Peridermium* disease. Recommendations are also given on kind of soil and character of aspect and elevation these trees require. Alpine fir and lodgepole pine will be used in an effort to bring the timber line in Norway to a higher elevation than at present.—*J. A. Larsen.*

1263. SONNENBURG. Kiefern-Saat und -Pflanzung in Pflugfurchen. [Seeding and planting of pine in plowed furrows.] *Deutsch. Forstzeit.* 36: 366-367. 1921.—The author describes a method of plowing furrows for sowing and planting pines on clear cut areas, and recommends this method as cheap and effective.—*W. N. Sparhawk.*

1264. SORHJELT, K. Om den nye eiendomstaksering i 1922 i Sverige, saerlig hvad angaaer skog. [On the new property tax system in Sweden, particularly in regard to forests.] *Tidsskr. Skogsbruk* 29: 308-316. 1921.—The essential features of the new method of taxing forest land and timber are: a uniform rating for the entire country, assessment based on net returns, standard tables of rating values which allow for normal, subnormal, or super normal yield, and for good, average, or poor operating conditions. The forest value in normal times capitalized at 6 per cent is fixed by multiplying the net returns by 16.67, of which 18 per cent represents the land value and 82 per cent the value of the product. In evaluating forest land its present productiveness is not considered. The value of the forest itself is fixed according to the present stand, its condition, and the yield which the stand can be expected to give if well managed. A normal forest rated 1.0, subnormal yields reduce it to 0.9, 0.8, etc.; above normal, 1.1, 1.2, etc. A forest containing principally young immature stands is rated low irrespective of quantity. Products and areas set aside for home use are taxed separately. The chief function of appraisers and assessors is to determine to what extent the yield of the holding compares with the accepted normal, and whether operating and market conditions are good, average, or poor. Foresters have been influential in framing this law and will everywhere have a strong hand in applying it.—*J. A. Larsen.*

1265. SPRINGER, J. F. The story of cork. *Sci. Amer.* 125: 270-271. *4 fig.* 1921.—Sources of the raw material, cork-producing capacity of the trees, manner of stripping, preparing and transporting the crude cork, and its subsequent manufacture into stoppers are discussed.—*Chas. H. Otis.*

1266. STANG, THOMAS. *Pinus montana*. (Pin à crochets.) *Tidsskr. Skogbruk* 29: 252-258. *Fig. 2.* 1921.—Comparisons of air temperature conditions for the Pyrenees and the west coast of Norway were made with a view to introducing this species into Norway.—*J. A. Larsen.*

1267. STAUBESAND. Zur Begründung von Eichenbeständen in den Oberförstereien Weilburg, Hofheim, und Königstein im Regierungsbezirk Wiesbaden. [Concerning the establishment of oak stands in the forest districts of Weilburg, Hofheim, and Königstein in Wiesbaden.] *Zeitschr. Forst- u. Jagdw.* 52: 410-415. 1920.—Both *Quercus pedunculata* and *Q. sessiliflora* occur in the above forest district. The mountainous character of the country, the greater tolerance, more rapid growth in youth, and smaller temperature demand of *Q. sessiliflora*, with its general silvical advantages over *Q. pedunculata*, make the former preferable. The original stand of pure oak was more extensive than the present one. Clearing for agricultural purposes and soil retrogression were the chief factors in decreasing the area. Despite the ease of securing natural oak reproduction, few natural stands are found in this region because of the lack of good seed years and unfavorable soil conditions. Sowing has been extensively employed,—under pure oak, pure beech, and under mixtures of both species. Under ordinary conditions the oak predominates over beech until approximately the 50th year, after which the latter grows above and suppresses the oak. The supremacy of the oak must be assured by regular thinnings every 3-4 years. To insure oak reproduction and to convert the better soil areas to oak forest various clear cutting methods (preferably by alternate strips) have been instituted in selected localities of dense forest.—*J. Roeser.*

1268. STEPHAN. Zur Streitfrage "Hoizzucht in der Hochwaldbetriebsform mit Kahl-schlagverjüngung." [In reference to the controversy: Timber production under the high forest system with reproduction following clear cutting.] *Zeitschr. Forst- u. Jagdw.* 52: 497-523. 1920.—Referring especially to the pine forests in the comparatively dry region of northeastern Germany, the author discusses the question of whether the high forest management utilizes all factors to satisfy the physiological needs of the forest, or whether the obstacles now generally conceded can be removed so as to establish its value. The failure of foresters to apply simple physiological facts is 1 cause for the lack of success. Two important remedies suggested are: thorough fall plowing and turning under of the humus in order to conserve the moisture and increase bacterial activity in the upper surface of the soil, and proper thinnings. Principles involved in sowing and planting are also discussed. The author feels that the present system should be perfected scientifically rather than that a more "natural" system be attempted.—*J. Roeser.*

1269. STEVENS, HENRY P. Position and prospect of the plantation rubber industry. *Jour. Soc. Chem. Indust.* 40: 269R-271R. 1921.—The world's rubber output is at present 90 per cent plantation rubber. The reduced price has caused a reduction of 50 per cent in the output. The general tendency is to conserve the bark, since drastic tapping injures the trees. Draining causes a blocking of the latex system by gum. Seed selection is advised.—*G. B. Ray.*

1270. STEVENS, JOHN, 3RD. Bamboo as a paper making material. *Paper Industry* 3: 84-87. *Fig. 1-2.* 1921.—Propagation of bamboo in the U. S. A. is described, and its composition and utilization discussed.—*H. N. Lee.*

1271. STROTT, J. Über Buchenwirtschaft. [Management of beech forests.] *Deutsch Forstzeitg.* 36: 413-444. 1921.—Supplies of coal being much restricted as a result of the war, fuel-wood is in great demand, and beech is likely to become more important in German silviculture. Suggestions are made regarding methods of cutting and soil preparation to insure natural reproduction in beech stands.—*W. X. Sparhawk.*

1272. SUTERMEISTER, E. Decay of pulpwood and its effect in the soda process. *Pulp and Paper Mag.* 19: 733-756. 1921.—Methods and results from both sound and decayed wood

are given. Decay in wood decreases the weight per cubic foot out of all proportion to the shrinkage in volume. Decayed wood gives much lower yield and poorer quality of pulp than sound, increases the relative cost of production, and produces fiber which it is difficult or impossible to bleach.—*H. N. Lee.*

1273. SWAIN, E. H. F. Annual report of the director of forests for the year ended 30th June, 1921. Ann. Prog. Rept. Queensland Forest Serv. 1920-21; 43 p. 2 maps. 1921.—The work of the Service is summarized under the following captions: Forest Demarcation, Reservations, Silviculture, Forest Protection, Forest Survey and Engineering, The Timber Market, The Forest and Timber Industries, Timber Contracts, Office Operations, Forest Service Sawmills, Financial, Administrative Matters. New plantations aggregating 125 acres were established during the year—the 1st extensive planting undertaken in Queensland.—*C. F. Korstian.*

1274. T[OURNEY], J. W. On the viability of tree seeds after storage for ten years. Jour. Forestry 19: 814. 1921.—The results of storing seed of 30 tree species for 10 years in unsealed glass jars under laboratory conditions show that seed of 10 species remain viable. *Pinus attenuata* ranks 1st with 69 per cent germination, *P. rigida* 2nd with 27 per cent, and *Robinia pseudacacia* 3rd with 21 per cent germination.—*E. N. Munns.*

1275. T[OURNEY], J. W. [Rev. of: HOLE, R. S. The regeneration of sal (*Shorea robusta*) forests. Indian Forest Records 8: 163-228. 1921 (see Bot. Abst. II, Entry 1195.)] Jour. Forestry 19: 788-790. 1921.—Studies similar to those undertaken by Indian foresters are necessary in the U. S. A. to aid in securing satisfactory regeneration of our tree species.—*E. N. Munns.*

1276. T[OURNEY], J. W. [Rev. of: ROBBINS, WILLIAM J. Precipitation and growth of oaks at Columbia, Missouri. Missouri Agric. Exp. Sta. Res. Bull. 44. 1921.] Jour. Forestry 19: 700-703. 1921.—The correlation of growth with climate is not yet satisfactorily solved, as the degree of stocking, suppression, and the influence of external factors are much more important. Although the present study shows consistent correlation, this would probably disappear with other environmental factors.—*E. N. Munns.*

1277. TOTMER, J. W. The present situation of forestry with special reference to state forestry. Science 54: 559-566. 1921.

1278. TOTMER, J. W. The state's responsibility in a forest program. Amer. Forestry 27: 784-785. 1921.

1279. WAGNER, CHRISTOF. Die Sozialisierung der Forstwirtschaft. (The socialization of forestry.) Deutsch. Forstzeitg. 36: 245-248, 267-269. 1921.—Wagner explains why he believes that acquisition of all forests by the State, or strict state supervision of private forests, will not result in better forest management. He believes that self-interest of the owners will lead them to practise the best form of management, if the state and associations of owners will provide expert assistance and remove the various obstacles which hinder such management.—*W. N. Sparhawk.*

1280. WATSON, RUSSELL. A national policy for foresters. Jour. Forestry 19: 748-751. 1921.—Foresters are urged to force the issue and demand proper regulation of forests.—*E. N. Munns.*

1281. WATSON, RUSSELL. (Rev. of: McCARTHY, E. P., and H. C. BELYEAN. Yellow birch and its relation to the Adirondack Forest. New York State Coll. Forest. Tech. Publ. 12. 50 p., illus. 1920.) Jour. Forestry 19: 678-683. 1921.—The authors overlook 2 silvicultural features which detract from the value of the work: 1) the application of limited data to the

region in which the yellow birch is indigenous; (2) the lack of a site standard. Much of forest management practice must be left to the judgment of the men on the ground.—*E. N. Munns*.

1282. WIMMER. Die Pflanzenökologie und ihre Beziehungen zur Forstbotanik und zum Waldbau. [Relation of plant ecology to forest botany and silviculture.] Forstwiss. Centralbl. 43: 261-268. 1921.—Wimmer outlines Tschulok's classification of botanical science into 7 divisions (systematics, morphology, physiology, ecology, chorology, chronology, genetics), and Rübel's conception of geobotany, including 2 phases.—the study of the single species, and plant sociology, or the autecology and synecology of H. Gams. Asserting that forest production is applied plant sociology, the author discusses Heinrich Mayr's theories of silviculture and his conceptions "biology of the stand," "sociology of the stand," "climatology of the stand."—*W. N. Sparhawk*.

1283. WRIGHT, H. L. Preparing bamboos for the market. Sci. Amer. 125: 102. 3 fig. 1921.

1284. WÜRNER. Die Bedeutung und Verwendung von Weiden im Weinbau. [The importance and use of willows in vineyard culture.] Mittel. Deutsch. Landw. Ges. 36: 577-580. 1921.—The slender shoots of certain willows are very useful for tying grape shoots. The quality of varieties of *Salix purpurea*, *S. americana nigra*, and *S. pulebra* or *S. Caspica*, and cultural methods important in growing willows, are discussed.—*A. J. Pieters*.

1285. ZON, RAPHAEL. Research—an aid to forest perpetuation. Australian Forest. Jour. 4: 65-69. 1921.—The author discusses the great need for perpetuating the remaining timber supplies and the rôle of forest research in forest conservation and in wood utilization.—*C. F. Kortian*.

GENETICS

GEORGE H. SHULL, *Editor*

J. P. KELLY, *Assistant Editor*

(See also in this issue Entries 889, 890, 898, 907, 909, 921, 926, 939, 971, 983, 996, 1117, 1170, 1269, 1465, 1467, 1470, 1479, 1480, 1483, 1493, 1495, 1499, 1501, 1505, 1512, 1514, 1516, 1524, 1530, 1533, 1557, 1574, 1592, 1611, 1612, 1636, 1639, 1640, 1655, 1688, 1727, 1734, 1737, 1739, 1919, 1963, 1996, 2012)

1286. ANONYMOUS. Flax experiments and demonstrations 1921. Jour. Dept. Agric. Ireland 21: 323-326. 1921.—A comparison is made of various pure-line strains and commercial varieties of flax. The source of the seed seemed to be less important than the genetic characters of the pure line.—*H. K. Hayes*.

1287. AAMODT, OLAF S. Correlated inheritance in wheat of winter-spring habit of growth and rust resistance. [Abstract.] Anat. Rec. 23: 89-90. 1922.—The parental varieties, Kanred and Marquis, belong to *Triticum vulgare*. Kanred, a winter wheat, is resistant to several biologic forms of *Puccinia graminis* Trifolii (Eriks. & Hemm.), to which Marquis, a spring wheat, is susceptible.—At University Farm, St. Paul, Minnesota, the Kanred parent, when planted in the spring, produces only an occasional head late in the season, which fails to set seed. The F_2 Kanred-Marquis cross was planted in the spring and the plants were placed in 9 groups according to time of heading; 7 of these groups set seed and were tested in F_1 . All individuals of the earlier-heading F_2 group bred true for spring habit of growth. In the other 6 groups in F_2 the percentage of spring plants was in direct relation to the time of heading of the F_2 group.— F_2 seedlings of each F_2 group were inoculated, in the greenhouse, with a single known biologic form of rust. The segregation approximated a ratio of 3 resistant to 1 suscep-

tible plant. The ratio of resistant to susceptible plants was approximately the same for all heading periods. Preliminary tests indicate that the reaction to several biologic forms was inherited as a single genetic factor.—*Olaf S. Aanondt.*

1288. ACQUA, C. [French rev. of: COULTER, JOHN M., and MERLE C. COULTER. *Plant genetics. 19 X 12 cm., ix + 214 p., 40 fig.* Univ. Chicago Press: Chicago, 1918 (see Bot. Absts. 2, Entry 395).] *Scientia* 30: 195-497. 1921.

1289. ALVERDES, F. [German rev. of: ALVERDES, F. *Rassen und Artbildung. (Race and species formation.)* Abhandl. Theoret. Biol. 9. 118 p. 1921.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 27: 152-160. 1921.

1290. ANDRASSY, KARL. *Ein Beitrag zur Vererbung der Katarakt.* [Contribution to the inheritance of cataract.] *Klin. Monatsbl. Augenheilk.* 66: 568. 1921.—Andrassy raises the question as to whether cataract is inherited as a specific germ-plasm anomaly or is developed through the influence of certain other organs or organ groups. The literature (very fully reviewed) gives the impression that most German observers believe that cataract is not inherited as such, but that other general diseases, such as tetany, finally result in the development of cataract. The author cites a family in which the introduction of a "rachitic and nervous" tendency caused an outbreak of what he terms a latent or recessive cataract. He suggests that perhaps the defect of the lens is bound up with tendencies toward psychoses, nervousness, and defects in bone growth, all resulting from defects in internal secretion.—*M. F. Weymann.*

1291. AREY, LESLIE B. *Chorionic fusion and augmented twinning in the human tube.* [Abstract] *Anat. Rec.* 23: 101. 1922.—The data from all known cases of human tubal twins indicate that the ratio of monochorial to dichorial specimens is about 15 times greater in the tube than in the uterus. Illustrative stages are at hand which indicate that this disproportion results in part from the secondary fusion of the chorionic sacs of dizygotic individuals. Hence, for man the term "monochorial" need not always connote a single ovum origin. However, a still more potent factor appears to be an actual augmentation of the twinning impulse. Its cause is most clearly referable to tubal inflammation and its sequelae. The same delays and arrests which cause and follow tubal implantation are largely responsible for both the increased twinning and the excessive malformation of tubal specimens.—*Leslie B. Arey.*

1292. ARKWRIGHT, J. A., E. E. ATKIN, and A. BACON. *An hereditary Rickettsia-like parasite of the bed-bug (*Cimex lectularius*).* *Parasitology* 13: 27-36. 2 pl., 1 fig. 1921.—With the purpose of differentiating the organism under observation, the Rickettsia-organisms, divided into 9 groups, are considered with reference to distinguishing characteristics, such as staining, morphology, and cultivation.—Normal *Cimex*, i.e., of uncontaminated environment, is found to be infected by a Rickettsia-like organism, not included in the 9 groups above cited. The forms occurring are coccoid or diplococcoid, rods, and threads; from the last, coccoid forms are discharged. The identity of the latter coccoid forms with the former has not been fully established.—Cultivation failed on the richer media, as also inoculation of mice. Infection of *Cimex* is transmitted by heredity, as is proved by the discovery of the organism in the "normal" virgin female host, especially in ova; also, in the testes of the male. The infection of *Cimex* by this organism seems general. The name *Rickettsia Lectularia* is suggested.—*Andrew I. Dawson.*

1293. ARON, M. *Sur le conditionnement des caractères sexuels secondaires chez les Batraciens Urodèles.* [On the determination of secondary sexual characters in Urodean Batrachians.] *Compt. Rend. Soc. Biol.* 85: 482-484. 1921.—The author finds that the secondary sexual characters of *Trachycnemis* are due to secretions of a temporary endocrin-gland which develops as a transformation of nurse cells in the hilum of the testis. Its cells

are rich in lipoids. The gland is present only during the mating period. When the author destroys this gland by galvanocauterization, leaving undisturbed all the other testicular elements, the secondary characters promptly disappear. This organ apparently plays the same rôle as the interstitial tissue of mammals, of which there is none in *Triton*.—C. L. Parmenter.

1294. ATCHINLECK, G. G. Experiments on the selection of yellow flint maize 1916-1920. Mauritius Dept. Agric. Gen. Ser. Bull. 18. 20 p., 6 pt. 1920.—The structure of the maize ear is discussed and the arrangement of the paired spikelets conceived as being in whorls or rings around the circumference of the cob. In a cross section of a dissected ear lines drawn joining the spaces between the several pairs will be found to form a regular rectilinear figure upon each angle of which is borne a pair of spikelets.—The different-rowed ears are divided into 2 classes based on the form of this rectilinear figure and called the symmetric and zygomorphic series.—Hereditiy studies of row number in plantings with uncontrolled pollination show row number to be inconstant, but in general the progeny of many-rowed parents have ears with more rows than the progeny of few-rowed parents. Starting with an 18-rowed ear the 1st generation had but 41.1 per cent of the ears 18-rowed, while in the 5th generation 66.94 per cent of the ears were 18-rowed. The author partially retracts the statement made in a previous bulletin (No. 8, General Series) "that as the number of rows increases the weight of a row of seeds decreases," finding that the decrease was due largely to having examined ears selected for size and weight. When unselected ears are analyzed, while there is a general tendency toward a decrease in row weight with an increase in row number, the diminution is by no means marked.—In the 5th generation, too, a large percentage of the plants produced female terminal inflorescences and in all these cases the plants tillered strongly. It is stated also that plants bearing ears low down on the stem were usually early-fruited types. The author concludes that for the colony of Mauritius 16-to 18-rowed strains, if maintained by careful selection, are likely to lead to increased yields. J. H. Kempton.

1295. BARKER, E. EUGENE. Bud variation in the sugar-cane. Jour. Heredity 12: 271-274. 1 fig. 1921. Sugar-cane varieties vary much in purity of juice and sucrose content, and in their adaptability to different soil types. Some attain maximum sucrose content much earlier than do others. Similarly, they differ in resistance to "root-disease," matizado, and gummosis. Many varieties are known to have originated as bud-sports; probably a great majority of them have thus originated. Numerous instances are cited of bud-sports in old varieties. Attention is called to the desirability of careful chemical studies to discover qualitative variations affecting quality of juice, yield, disease resistance, ratooning power, etc., as a basis for selecting better strains of old varieties.—E. E. Barker.

1296. BARTH, FRITZ. Ein weiterer Beitrag zur Vererbung der familiären Sehnervenatrophie. [A further contribution to the heredity of familial atrophy of the optic nerve.] Klin. Monatsbl. Augenhilf. 66: 581. 1921.—A review of the literature on the inheritance of Leber's disease reveals no case in which the disease is transmitted by a male to any of his descendants, either male or female. Thus it is concluded that von Lossen's rule is more applicable, i.e., that the disease is transmitted through healthy female carriers to male offspring, but that no male affected is capable of transmitting the disease. Whether a lethal factor is involved in the potentially affected offspring of the diseased male is uncertain. A large family history is given which seems to bear out the author's contention, but it is noted that the chance of the picture being essentially different if Horner's rule were followed is small owing to the death of 10 of the 11 daughters in infancy. The author concludes that the data collected demonstrate von Lossen's rule, but not Horner's.—M. F. Wegmann.

1297. BATNER, F. A. Biological terminology. Nature 107: 778. 1921.—The article is controversial in character and deals with definitions of "variation." L. R. Walbran.

1298. BAUEN, K. HEINRICH. Über den Konstitutionsbegriff. [On the constitution concept.] *Zeitschr. Konstitutionslehre* 8: 155-183. 1921.—The connotation of the term constitution can not readily be defined. An historical review of medical thought shows that the meaning of the word has varied with different authors, e.g., to one it is the traits potentially present at the moment of fertilization; to another it is the constellation of all the characteristics of an individual. The author finds it impossible to define this term with precision but considers it intimately related to the concept of person, "constitution" having a relation to "person" not unlike that of "phenomenon" to "ultimate reality." Any modern consideration of constitution must rest firmly on a foundation of the known facts of heredity. If heredity alone, however, is not all that is involved, as evidenced by the recovery of tuberculous patients who go to the mountains. In short, the constitution of an individual is the expression of his physical and psychic personality as manifested on the one hand by the reactions characteristic of his genotype and on the other hand by the modification of the norm of these reactions induced by extra-germinal influences. The differences in the constitutions of parent and child are due to universal heterozygosis, with its resulting new combinations, to occasional mutations, and to environmental factors. This complex presents a serious but not unsurmountable obstacle to the ultimate analysis of constitution.—*C. H. Danforth.*

1299. BLAKESLEE, ALBERT F. An apparent case of non-Mendelian inheritance in *Datura* due to a disease. *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 116-118. 1921.—About 1 per cent of the normal *Datura* plants in a field culture may be found at the end of the season to have changed in the following respects: The capsules are partially or completely smooth; the corollas have become slit; pollen is absent; and the lobing of the leaves resembles that of the oak. When these plants are pollinated by normals, about $\frac{1}{2}$ of the progeny are similarly abnormal. In the rare cases where pollen could be obtained from the abnormals, crosses with normals gave some abnormal offspring, showing that the abnormality was transmissible through the pollen.—Grafts of this *Quercina* form on normals caused the normals to be gradually changed into *Quercina*, proving the infectious character of the abnormality. The effects of this disease on the capsules had been observed, but not understood, by previous workers with *Datura*. The phenomena are more or less parallel to the cases of rogues in peas (*Pisum*) investigated by Bateson and Pellew.—*John Belling.*

1300. BLAKESLEE, ALBERT F. The globe, a simple trisomic mutant in *Datura*. *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 118-132. 1921.—Preliminary announcement of article published in *Genetics* 6: 241-264. 1921 [see Bot. Absts. 10, Entry 74].—*John Belling.*

1301. BLARINGHEM, L. Polymorphisme et fécondité du Lin d'Autriche. [Polymorphism and fecundity in Austrian flax.] *Compt. Rend. Soc. Biol.* 82: 754-758. 1919. —*Linen austriacum* shows a very marked floral dimorphism which is correlated with the compactness of flower groups and with fertility. Plants which produce flowers with short styles show greater compactness of flower groups than the plants producing flowers with long styles. Among the short-styled plants an average of 1 flower out of every 7-8 failed to open, as against approximately 1 flower out of every 21 of the long-styled plants. —*H. K. Hoyle.*

1302. BRADFORD, F. C. Variation in seedling apples. *Nation. Nurseryman* 29: 152. 1921.—At the Missouri Agricultural Experiment Station an orchard of apple seedlings of known parentage now contains 217 trees representing 16 crosses in numbers from 1 to 72. The peculiarity of the orchard is the unevenness of growth. Certain combinations tend to produce sets of rather uniform growth; others produce an undue proportion of "runt" trees. Four crosses planted in 1913 and 3 in 1914 are tabulated showing, for each, average circumference and circumference of largest and smallest; obvious is the smaller growth of trees from crosses including Geniton. Individual trees in groups from crosses including this variety make satisfactory growth, but a large percentage of the trees are small. Including all trees, the average circumference of trees of Geniton parentage is 9.2 inches; of trees not including Geniton, 12.7 inches.—The largest trees have made uniformly good growth each year; the smallest never

have made good growth. A tree small because of adverse conditions may become a good tree under improved conditions, but trees constitutionally small never make good trees. There is no sure way of distinguishing between stunted and "runt" trees.—It is suggested that growers of seedlings consider carefully the source of seed. It seems probable that careful study will show that seed of certain varieties make more satisfactory stocks than of others, and the suggestion is made that it may prove desirable to segregate cider-mill pomace, from which seeds are to be taken, according to the varieties being used.—*C. S. Crandall.*

1303. BRECHER, LEONORE. Die Puppenfärbungen des Kohlweisslings, *Pieris brassicae* L. Vierter Teil. Wirkung sichtbarer und unsichtbarer Strahlen. [The pupal coloration of the cabbage butterfly. IV. Effect of visible and invisible rays.] Arch. Entwicklungsmech. 45: 273-322. 1919.—Caterpillars exposed to light of various wave lengths, during pupation and immediately afterward when especially sensitive to environmental influences, are either melanic (darkest upon black background), intermediate (upon gray, or in darkness), light (lightest upon white background), or green (upon exposure to yellow). Black surroundings, well illuminated, bring out dark pigmentation much more than darkness, increased intensity of light favoring elaboration of black pigment.—Ultra-violet rays reflected from black surroundings are the cause of deep melanic pigmentation, which is not induced by darkness; if these rays are eliminated, light-colored pupae are produced in black surroundings. Ultra-violet rays alone, devoid of visible color, produce their characteristic effect.—Quality, not intensity, of light determines the nature of the reaction, for the increase of the intensity of yellow rays reflected from every background increases greenness and decreases blackness; increase in the intensity of blue rays, however, favors black pigmentation.—If the eyes of caterpillars ready to pupate are covered with black varnish, the characteristic responses to the direct action of different colored backgrounds are in no wise affected; if burnt out by electrocauterization, however, pigmentation characteristic of darkness results. The rôle played by the eyes in coloration of the pupa, is not yet determined. The wide range of variation seen in pupae kept in the dark is possibly due to the action of hereditary factors. Probably infrared rays are concerned in the production of white pupae in white surroundings, but this is not yet proved to the author's satisfaction.—*J. H. Gerould.*

1304. BREEZE, MABEL S. C. Degeneration in anthers of potato. Gard. Chron. 70: 274-275. 1921.—The author found degeneration of 3 types in the anthers: (1) shrivelled pollen grains; (2) hypertrophied or swollen pollen grains; and (3) absence of pollen. The author suggests either lack of nutriment or irregular chromosome formation during reduction division as the cause of shrivelled grains. She further suggests the presence of toxins in the hypertrophied condition. Pending further investigation no theory is proposed as to cause of absence of pollen.—*H. E. Brewbaker.*

1305. BROMAN, IVAR. Zur Frage der Gen-Neubildung und der "Vererbung erworbeener Eigenschaften." [On the question of the formation of new genes and the "inheritance of acquired characters."] Anat. Anzeiger 54: 457-463. 1921.—R. Fick [Anat. Anzeiger 53: 475-479] had argued that evolution of specialized joints (fitted to move in 1 dimension only) from generalized joints could have come about only by means of inheritance of the effects of use. To explain the mechanism of such inheritance Fick postulated that hormones or other influences, originating in the used joints, caused the production in the germ cells of new genes that tended to modify the joints of the offspring in identical fashion. The author refutes this argument by pointing out that the same results could have been produced by mutation and recombination of genes. In similar manner he refutes the argument of Fr. Maurer [Anat. Anzeiger 54: 201-205] that the appearance of an arm-hole in the atrium of a developing tadpole even when the arm rudiment has been removed, proves the inheritance of the effects of pressure. He contends that the second case of Maurer,—dealing with the origin of folds in the colon as due to the inherited effects of pressure of balls of faeces,—is based on faulty evidence.—*H. J. Muller.*

1306. BROWN, E. British egg-laying tests or trials. *Reliable Poultry Jour.* 28: 66, 104-106. 4 fig. 1921.—The author gives a brief history of egg-laying contests in England and points out that although the contests have done a great deal of good in emphasizing utility, they tend to promote the abnormal and may lead to serious deterioration in the stock along lines of small eggs, lack of vitality, and lack of standard unless they are organized more along breeding lines to counteract these defects.—*H. G. May.*

1307. BUCHHOLZ, J. T., and A. F. BLAKESLEE. Studies on the pollen tubes and abortive ovules of the globe mutant of *Datura*. [Abstract.] *Anat. Rec.* 23: 90. 1922.—A technique of dissection was developed enabling the authors to stain and count nearly all pollen tubes within the nutritive tissue of the style. The pollen from globe produces upon germination 2 groups of pollen tubes, those that grow rapidly, and others that grow more slowly, as indicated by the bimodal curve of pollen-tube distribution in the style. A large number of abortive ovules are produced in globe selfed, in globe normal, and quite a few even in normal \times globe, the latter indicating that probably a number of pollen tubes transmitting the globe character actually reach the ovary above the small number of globe seeds produced by this cross. Counts have been made of the pollen applied, the residue of ungerminated pollen grains on the stigma, and the residue of pollen tubes remaining in the style after abscission, from which the number of pollen tubes entering the ovary may be estimated.—*J. T. Buchholz and A. F. Blakeslee.*

1308. CARR-SAUNDERS, A. M. Note on inheritance in swine. *Science* 55: 19. 1922.—Berkshire swine are characterized by (1) erect ears, (2) black coat with 6 white extremities, (3) a short dished face, and (4) a somewhat short and broad body. The Large Black breed is characterized by (1) "flop" ears, (2) self-black coat, (3) a face not dished and of moderate length, and (4) a longer narrower body. On a farm near Oxford, England, a Large Black boar was crossed to Berkshire sows. The F₁ generation showed that the erect ears (1) and the black coat with 6 white extremities (2) were dominant, while characters (3) and (4) were intermediate. The reciprocal cross gave the same results except for (2), which resulted in a gradation from black to spotted. The spotted pigs showed an approximately equal division of the black and white areas. The gradation was not uniform and 3 classes were readily distinguishable: (a) self-black, (b) black with 6 white points, and (c) spotted. All the spotted animals produced in the experiment were boars, hence it is possible that the spotting character may be sex-linked.—*Edicard N. Wentworth.*

1309. CASTLE, W. E. The genetics of the Dutch rabbit—a reply. *Jour. Genetics* 10: 293-299. 1920.—In answer to Punnett's criticism [see *Bot. Absts.* 5, Entry 1614] of Castle's interpretation [*Carnegie Inst. Washington Publ.* 288] of the results of crossing 3 types of Dutch spotted rabbits, Castle defends his hypothesis that only 1 main factor for Dutch appearing in 3 allelomorphic forms is necessary to explain the facts, the variations within each type and the modifications of the types after crossing being due to differing "residual heredity" in the 3 types. He answers Punnett's criticism that his hypothesis involves "mutual modification" of the types by crossing, by defining residual heredity as the complex of "unanalysed genetic agencies responsible for the observed modifications of the extracted types" or "minor or modifying factors" which "segregate and recombine independently of the chief factor." He counters Punnett's contention that 3 distinct factors are involved, by pointing to the monohybrid ratios which result when any 2 types are crossed. He further criticizes Punnett's alternative hypothesis on the ground that it fails to explain all the data (particularly those from back-crosses of Dark \times White Dutch hybrids to the recessive White Dutch parent); that it involves factors of unequal potency, and that it requires complicated subsidiary hypotheses. He agrees with Punnett that the case can be explained only by multiple factors, but concludes that there is but 1 main factor, modified by many minor ones.—*L. C. Dunn.*

1310. COLE, L. J., and J. G. HALPIN. Results of eight years of inbreeding of Rhode Island Red fowls. [Abstract.] *Anat. Rec.* 23: 97. 1922.—Selection on the basis of a non-

vital character (plumage color) resulted in a rapid deterioration of the stock, which ran out completely in 4 years. Egg production was affected to some extent, but the deterioration was particularly noticeable in vitality, as measured by hatchability of the eggs. In a second phase of the experiment the inbreeding has been of the same intensity, but selection has been based on vigor, as measured by good hatchability and strong vigorous chicks. This has resulted so far in raising the general vitality of the stock, though there appears to have been a loss of egg production, which has not been considered directly in the selections. The results can be interpreted as due to the inheritance of lethal, semi-lethal or physiological-defective factors, though no such have as yet been experimentally isolated.—*L. J. Cole and J. C. Halpin.*

1311. COLLINS, E. J. The problem of the inheritance of immunity to wart disease in the potato. *Gard. Chron.* 70: 260, 271, 290, 314, 326. 2 fig. 1921.—The author refers to the British Ministry of Agriculture's classification of potatoes into immune and susceptible sorts and to the uncertainty of the genetic nature of immunity. He outlines results to be expected if the difference between immune and susceptible kinds is monofactorial, and emphasizes the limitations to genetical work in many varieties due to lack of pollen. Pertinent available data (based on 5 seedlings of Dr. Wilson and 21 of his own) lead the author to suggest that susceptibility is due to a single dominant factor.—*J. P. Kelly.*

1312. COLTON, HAROLD SELLERS. Ten years with the self-fertilized line of *Lymnaea columella*. [Abstract.] *Anat. Rec.* 23: 97. 1922.—On the night of February 4, 1911, a pond snail from a tank in the vivarium laid a mass of eggs. The young snails hatching from those eggs were isolated from one another and so prevented from mating. Although cross-breeding was prevented, yet for 47 generations the line has continued to live because the snails self-fertilize their own eggs. Extending over a period of almost 10 years inbreeding of the very closest sort has been practiced, resulting in an animal of great theoretical gametic purity—greater perhaps than any other animal which reproduces sexually. The results with this line of snails agree with the experience of King, Wright, and others, namely, that inbreeding does not appreciably affect the viability of the race.—*Harold Sellers Colton.*

1313. CONKLIN, EDWIN GRANT. The mechanism of evolution. IV. Mendelian inheritance. *Sci. Monthly* 1920:170-181. 1920.—The chief problems of evolution concern manner of origin and fixation of inherited changes. Mendelism has contributed enormously toward the solution of these problems. Inheritance of alternative characters (illustrated by *Pisum* and *Mirabilis*) depends upon alternative genes which segregate and recombine independently of each other in Mendelian monohybrids, dihybrids, trihybrids, etc. Based on "purity" of germ cells for a given gene and chance union of germ cells in fertilization it is possible to calculate different possible combinations and relative proportions of these combinations among hybrid progeny. This is considered one of the greatest discoveries ever made in biology. The factorial theory holds that genes are elements, the combinations and interactions of which produce developed characters; that, in general, particular genes are differential factors in production of particular characters. Multiple factors, modifying factors, and lethal factors are peculiar types of genic relations, assumed in order to explain observed facts of heredity. The factorial theory is considered as necessary to the study of heredity as is the atomic theory to chemistry. Blending inheritance, instead of being a contradiction to Mendelian principle of segregation of interchanging factors, becomes an important argument in favor of that principle. In species hybrids the 1st generation is usually intermediate between the parents, which may be due to the fact that the species differ in many of their genes. In such cases very large F_2 populations must be raised to demonstrate all possible combinations, and especially if the relative proportions of these combinations are to be determined. Another and greater difficulty, in determining whether species-crosses are Mendelian, results from frequent infertility of such hybrids and from differential viability among resulting combinations. Unequal reciprocal hybrids furnish another exception to simple Mendelian relations which may be due to heterogamy or to balanced lethal factors.—*E. B. Babcock.*

1314. CORRENS, C. Die ersten zwanzig Jahre Mendelscher Vererbungslehre. [The first twenty years of Mendelian heredity.] *Festschr. Kaiser Wilhelm Ges. Förderung Wiss.* 1: 42-49. Julius Springer: Berlin, 1921.—Mendel's work is given in detail. Theories of heredity previous to 1900 are summarized, and the results of the re-discovery of Mendelism are discussed at length.—P. C. Mangelsdorf.

1315. COULTER, M. C. [Rev. of: CAROTHERS, E. ELEANOR. Genetical behavior of heteromorphic homologous chromosomes of *Circotettix* (Orthoptera). *Jour. Morphol.* 35: 457-483. 5 pl. 1921 (see Bot. Absts 10, Entry 81).] *Bot. Gaz.* 73: 80. 1922.

1316. COULTER, M. C. Species hybrids. [Rev. of: (1) EAST, E. M., and H. K. HAYES. Heterozygosis in evolution and in plant breeding. U. S. Dept. Agric. Bur. Plant Indust. Bull. 243. 58 p. 1912. (2) GOODSPED, T. H., and R. E. CLAUSEN. Mendelian factor differences versus reaction-system contrasts in heredity. *Amer. Nat.* 51: 31-46, 92-101. 1916. (3) EAST, E. M. A study of partial sterility in certain hybrids. *Genetics* 6: 311-365. 17 fig. 1921. (4) BABCOCK, E. B., and R. E. CLAUSEN. Genetics in relation to agriculture. 238 p. McGraw-Hill Book Co.: New York, 1918 (see Bot. Absts. 1, Entry 210). (5) SAX, KARL. Sterility in wheat hybrids. I. Sterility relationships and endosperm development. *Genetics* 6: 399-416. 1921 (6) SAX, KARL. Chromosome relationships in wheat. *Science* 54: 413-415. 1921 (see Bot. Absts. 11, Entry 1423).] *Bot. Gaz.* 73: 154-155. 1922.

1317. COULTER, M. C. Abnormal behavior in corn endosperm. [Rev. of: (1) WEBBER, H. J. Xenia or the immediate effect of pollen in maize. U. S. Dept. Agric. Div. Veg. Phys. and Path. Bull. 22. 44 p. 1900. (2) EAST, E. M. Xenia and the endosperm of angiosperms. *Bot. Gaz.* 56: 217-224. 1913.] *Bot. Gaz.* 73: 157-158. 1922.

1318. COURRIER, R. Glande interstitielle du testicule et caractères sexuels secondaires chez les poissons. [The interstitial gland of the testis and secondary sex characters in fishes.] *Compt. Rend. Acad. Sci. Paris* 172: 1316-1317. 1921.—The author describes periodic growth of interstitial gland of testis in the stickleback. This reaches its full development in April, when spermatogenesis is completed, being vascular, and its essential cells being filled with granules of secretion. The nuptial coloration of the fish develops at the same time. The author believes the latter to be due to hormone produced by interstitial cells, rather than to action of sex-cells proper.—F. B. Sumner.

1319 COURRIER, E. Sur le conditionnement des caractères sexuels secondaires chez les poissons. [On the determination of secondary sexual characters in the fishes.] *Compt. Rend. Soc. Biol.* 85: 486-488. 1921.—This is substantially a duplication of the article abstracted in the preceding entry.—F. B. Sumner.

1320. CREW, F. A. E. Sexual dimorphism in *Rana temporaria*, as exhibited in rigor mortis. *Jour. Anat.* 54: 217-221. 2fig. 1920.—The author finds that rigor mortis which follows death by immersion in chloroform liquid brings out a striking difference in males and females. The head of the males is strongly flexed upon the chest, the vertebral column is arched and the abdomen tensely concave, the forelegs are brought tightly across the chest with the palm of the hands together and fingers interlocked. In contrast, the head of the female is not flexed, the back is straight and the abdomen full, and the forelegs are extended at the side of the body. This dimorphism is due to the much stronger development in the male of 3 muscles, the rectus abdominus, the flexor carpi radialis, and the abductor indicis longis.—C. L. Parmenter.

1321. CROZIER, W. J. Orthogenesis of non-homochromic pigmentation in chromodorids. [Abstract.] *Anat. Rec.* 23: 98. 1922.—In all species of *Chromodoris* for which color descriptions exist, indication is had of the presence of 2 distinct types of integumentary pigments. One of these substances has a characteristic band absorption spectrum and other properties per-

mitting ready identification. As obtained from different species (Bermuda, California), this substance is chemically very similar, perhaps identical. Since the habits of the various species are different, the relation of coloration to habit may be interpreted in accord with modern genetic views of adaptation.—*W. J. Crozier.*

1322. DALCQ, ALBERT. Note sur la spermatogénèse de l'orvet. (Aspects nucléaires de la lignée typique; existence d'un hétérochromosome.) [Note on the spermatogenesis of the orvet. (Nuclear aspects of the typical line; existence of a heterochromosome.)] Compt. Rend. Soc. Biol. 83: 995-997. 1920.—The spermatogonial cells of *Anguis fragilis* possess probably 24 microsomes and 19 macroosomes. Of the latter, 1 large element appears to be the heterochromosome, which passes undivided to half the spermatids at the 2nd maturation division.—*A. S. Romer.*

1323. DALCQ, ALBERT. Note sur la spermatogénèse de l'orvet. (Étude des cellules séminales atypiques.) [Note on the spermatogenesis of the orvet. (Study of the atypical seminal cells.)] Compt. Rend. Soc. Biol. 83: 1302-1304. 1920.—Multipolar spermatogonial mitoses in *Anguis fragilis*, often not accompanied by cell division, result in the formation of spermatocytes with giant nuclei or several nuclei, with consequent abnormal numbers of chromosomes. The behavior of the chromosomes at the 1st maturation division is difficult of explanation except under the theory of parasympysis.—*A. S. Romer.*

1324. DANFORTH, C. H. The question of digital homology. [Abstract.] Anat. Rec. 23: 14-15. 1922.—The character of a digit appears to be regulated by at least 2 factors. One is the tendency of limb-buds to produce terminal lobulations, the other is something in the general nature of gradients between the pre- and post-axial borders. The "gradients" of the upper and lower limbs are apparently equivalent, but the lobulations do not seem to be so. When the hand and foot are compared it becomes apparent that, if the digits of the 2 limbs are considered as equivalent units, many comparable features are nearer the preaxial side of the foot than of the hand. Thus, in the hand the longest digit is the 3rd; in the foot, usually the 2nd. Hair centers for the mid-digital segments are on the 4th finger and the 3rd toe. The Mm. interossei are oriented with reference to the 3rd finger and the 2nd toe. Other muscles and bones show similar tendencies, although less clearly. Simple hereditary syndactyly involves the 3rd and 4th fingers, the 2nd and 3rd toes. Accessory tendons from the preaxial side reach the 2nd finger oftener than they reach the 2nd toe. Tendons to the 5th toe are suppressed more frequently than those of the 5th finger. These facts, with the strongly corroborative evidence from polydactyly, are interpreted to mean that the digits of the hand are not serially homologous with those of the foot, the great toe being equivalent to rather more than the thumb, the little toe to somewhat less than the little finger.—*C. H. Danforth.*

1325. DAVENPORT, CHARLES B. Heredity of build. [Abstract.] Anat. Rec. 23: 94. 1922.—The best quantitative expression of build and the environmental and general physiological factors influencing build are considered; as also the hereditary factors determining build and their method of action, together with some discussion of the interdependence of the general physiological and hereditary factors.—*Charles B. Davenport.*

1326. DEHORNE, ARMAND. L'hétérotypy dans la mitose somatique de *Corethra plumicornis*. [Heterotypy in somatic mitosis of *Corethra plumicornis*.] Compt. Rend. Acad. Sci. Paris 172: 931-933. 1921.—Longitudinal division begins in the spireme stage the twisted halves giving the appearance of strepsinema; when the parts become untwisted they lie at a distance from each other. As the metaphase spindle forms the parts approach and appear as 6 chromosomes grouped in pairs. Soon the arms become fused, and the appearance of tetrads is produced by a clear space remaining at the center. Later the fusion is completed, and when the metaphase plate is formed only 3 chromatic elements remain; this Dehorne regards as the true somatic number. In anaphase each daughter chromosome has the form of a double V; 3 chromosomes, each composed of 4 arms, pass to each pole. During telophase, the

elements of each V conjugate. That the parts which conjugate are halves of a single chromosome the author considers established by the number which he finds in metaphase (3); if homologues he would expect 6 chromosomes in metaphase, each longitudinally split.—The author concludes that somatic chromosomes of *Corethra* are always double. The mitoses are of an exceptional type presenting several features usually associated with the 1st maturation division. This division, on the other hand, lacks such characteristic stages as leptotene, pachytene, and strepsinema; these characters are not then necessarily associated with tetrad formation,—they are independent of the idea of germinal maturation and claim an interpretation of an entirely different nature from that proposed for them up to the present by morphologists.—*E. Eleanor Carothers.*

1327. DEHORNE, ARMAND. Spermatogénèse de *Corethra plumicornis* et chromosomes eupyrénés. [Spermatogenesis of *Corethra plumicornis* and eupyrene chromosomes.] Compt. Rend. Acad. Sci. Paris 171: 1399-1402. 1920.—Dehorne having previously examined both whole mounts of larvae and sectioned material of this dipteran, reported the number of somatic chromosomes as 3 and suggested that since the number is unequal and small a study of maturation divisions should be interesting. The present paper traces the behavior of chromatin from beginning of growth period to end of maturation. The author finds synapsis (synizesis) but no leptotene, pachytene, or strepsinema. When the 1st spermatocyte spindle forms, there are 3 typical cross-shaped chromosomes, the parts of which are distributed in the usual manner by 2 maturation divisions.—The conclusion is reached that both the somatic and haploid number of chromosomes in *Corethra* is 3. Two explanations are offered: (1) Each pronucleus contributes 3 chromosomes to the 1st cleavage spindle, which shows 6; during telophase these conjugate in pairs. At 2nd cleavage, the pairs separate. This is, then, the real reduction division. (2, favored by Dehorne) Each pronucleus is formed of substance of 3 chromosomes, but when the pronuclei fuse the chromatin combines, and from the resulting chromatin mass 3 new chromosomes are formed about centers independent of the previous chromosomes. These chromosomes are especially rich in chromatin. The 1st cleavage nucleus would then contain 3 instead of 6 chromosomes. At 1st maturation division, these assume the form of heterotype chromosomes. Two maturation divisions take place, as in cases of true numerical reduction, but effect only a reduction in mass, changing the chromosomes from eupyrene to oligopyrene condition (eupyrene, oligopyrene,—terms introduced by Meves, the former meaning rich in chromatin, the latter poor in chromatin).—*E. Eleanor Carothers.*

1328. DEKRUIF, PAUL H. Dissociation of microbic species. II. Mutation in pure-line strains of the bacillus of rabbit septicemia. Proc. Soc. Exp. Biol. and Med. 19: 34-37. 1921.—The appearance of strains of septicemia-producing bacilli of greater (strain D) and lesser (strain G) virulence suggested experiments to determine transition from one strain to the other.—Pure strains, isolated from rabbit septicemia by Barber's method and cultured on rabbit serum, exhibited D-trait; but transplants cultured on broth developed G-trait. Peptone favored the transition from D to G the latter maintaining persistent characteristics.—*Andrew I. Dawson.*

1329. DEMOLL, R. Zur Frage nach der Vererbung vom Soma erworbener Eigenschaften. [On the question of the inheritance of acquired characters.] Arch. Entwicklungsmech. 46: 4-11. 3 fig. 1920.—The author found a carp with 1 tooth in an abnormal position so that it was, and had been, functionless. Even this tooth showed the characteristic surface of a grinding tooth. It is usually accepted that these teeth receive their grinding surface through use and that this acquired character is not inherited; this tooth, however, would indicate that the grinding surface is an inherited character. The author does not think that these forms are caused by mutations, as a slight indication of a grinding surface is already discernable in *Abramis*, more developed in the tench (Schleie), still more in *Carassius* (Karausche) and best in the carp (Karpfen). He explains it by specific influences of somatic reactions upon the germ-plasm in the course of evolution.—*L. A. Waitzinger.*

1330. DETLEFSEN, J. A. A new mutation in the house mouse. Amer. Nat. 55: 469-473. 1921.—The original specimen was caught wild on a farm 7 miles from town. Early in life the pelage is practically white and the eyes paler than in the wild. Later, the pelage becomes brownish, and the eyes are indistinguishable from normal. Dark pigment occurs on the ears and scrotum. This form is allelomorphic to albinism. It seems to be imperfectly dominant to the latter, and recessive to color. It may prove to be homologous with the ruby-eyed dilute form of rats.—*F. B. Sumner.*

1331. DETLEFSEN, J. A., and L. S. CLEMENTE. Genetic analysis of low crossover stock, produced by selection. [Abstract.] Anat. Rec. 23: 97. 1922.—A stock of *Drosophila melanogaster* produced by selection and giving about 5-6 per cent crossing over between red eye and long wing vs. white eye and miniature wing was mated to a stock of white eye, crossveinless, cut-wing, miniature, forked. The results of the F_1 and F_2 show that: (1) One of the 2 homologous chromosomes alone has been affected, namely, the one carrying red eye and long wing. The other chromosome carrying white eye and miniature wing was apparently unaffected by selection. (2) The regions from red to cross-veined and from cross-veined to not-cut are about 13 and 7 units long, respectively, but in our low-selected series these regions have been very greatly reduced, perhaps to less than 1 unit. The region from not-cut to long wing is about 16 units, normally, but has been reduced to about $\frac{1}{4}$ of this value. The region to the right of long wing up to not-forked has been slightly reduced in crossover value, although this region was not involved directly in the process of selection. The total distance between red eye and long wing is about 33 units, normally, but in our low series it has been reduced to 5 units, or at least the percentage of crossing over is about 5 per cent. Comparison of F_1 and F_2 distributions show that the latter are more variable.—*J. A. Detlefsen and L. S. Clemente.*

1332. DORSEY, M. J. Some difficulties in fruit breeding. Sci. Agric. 2: 118-120. 1921.—Self- and cross-sterility, reduction in vigor, arrested growth in gamete or zygote, render it difficult to develop breeding stock of known genetic constitution. It is necessary to follow in detail the development and functioning of sex structures, to study the progeny of each controlled cross from an economic standpoint, and to study the inheritance of characters in the available material of known crosses.—*B. T. Dickson.*

1333. DRUDE, O. Erfahrungen bei Kreuzungsversuchen mit *Cucurbita Pepo*. [Experiences in crossing experiments with *Cucurbita Pepo*.] Ber. Deutsch. Bot. Ges. 35: 26-57. 1 pl., 3 fig. 1918.—A report of breeding work with squashes, especially *Cucurbita Pepo*, carried on since 1892 is reported. The author finds that in general the various species do not cross, although he obtained 1 fertile hybrid between *C. Pepo* and *C. ficifolia*. *C. Pepo* is very rich in forms; he worked with 6 of these: "White Apple," "Orange," "Cucumber," "Warty," "Umbrella," and "Fordhook." Many pollinations were unsuccessful. It was found especially difficult to effect self-fertilization, and when successful this led quickly to loss of vigor and self-sterility. The author maintained his races by crossing sister plants. He states that many characters are not inherited in Mendelian fashion, and that frequently the results from reciprocal crosses are markedly different. He discusses 3 experiments in detail: (1) "Striped Apple," the fertile hybrid between *C. Pepo* and *C. ficifolia*, was developed as a smooth type but when crossed with Fordhook (smooth) produced some warty offspring. This the author believes to be a case of cryptomeria, or the inoperation of a character over a long period. (2) An attempt was made to mix thoroughly the 6 forms used by a system of cross-pollinations, and to see which type predominated in these "hexaphyletic" hybrids. Much "polymorphism" resulted. Certain races tended to impress their characters on the offspring and to reappear in these hybrids, while others were lost. Groups of characters seemed to hold together. (3) A warty type crossed with a smooth gave different results in reciprocal crosses. In one case 1 smooth plant was produced which gave rise only to smooth plants. In the other, 2 warty plants were obtained which gave rise to both warts and smooths. This is the only case where an analysis of the offspring, with definite counts, is presented.—The author is primarily interested in the development of new races, or "Kleinarten," especially through cross-fertilization.—*E. W. Sinnott.*

1334. DUCLOUX, E. Sur la formation de races asporogènes du *Bacillus anthracis*. Atténuation de sa virulence. [On the formation of asporogenous races of *Bacillus anthracis*. Attenuation of its virulence.] Compt. Rend. Acad. Sci. Paris 170: 1527-1529. 1920.—Experiments dating from 1916 on culture media of vegetable nutritive base furnished promising material for the study of bacterial changes. *Bacillus anthracis* cultured for 38 generations on a medium made from *Opuntia vulgaris* showed asporogenous forms persevering, of mitigated virulence, producing antibodies against virulent strains. *Linum usitatissimum* employed as a medium produced like results. It is suggested that the cytoplasm of *B. anthracis*, cultured on the media above mentioned, is subjected to profound chemical modifications which do not inhibit the action of the phagocytes.—Andrew I. Dawson.

1335. ELLINGER, TAGE. The influence of age on fertility in swine. Proc. Nation. Acad. Sci. (U. S. A.) 7: 134-138. 1 fig. 1921.—The material for this investigation was found in 134 sows of the native Danish breed that had produced 10 litters each. These sows produced regularly $2\frac{1}{2}$ litters per year, hence the number of litters was closely correlated with age, and the size of litter proved to be correlated with the ordinal number of the litter. The average number of pigs per litter was 11.5. The data on which the study was based were as follows:

	LITTER NUMBER										AVERAGE
	1	2	3	4	5	6	7	8	9	10	
Average size	9.45	10.01	11.50	12.01	11.99	12.16	12.13	12.34	11.90	11.66	11.52
Calculated size.....	9.25	10.42	11.24	11.81	12.19	12.35	12.39	12.24	11.92	11.43	11.53

Plotting these data disclosed the fact that a logarithmic curve similar to that discovered by Pearl on changes in milk flow corresponding to age in dairy cattle, governed the changes in fertility as related to age in swine. The general form of this is

$$y = a + bx + cx^2 + d \log x,$$

where y equals the size of litter and x the ordinal number of the litter. In this special case the equation proved to be:

$$y = 8.414 + 0.915x - 0.078x^2 + 1.627 \log x.$$

The maximum litter was found to occur between the 6th and 7th at 6.56. The expectancies based on the special formula just given are quoted in the table under the heading "Calculated size."—Edward N. Wentworth.

1336. EMERSON, R. A. Genetic evidence of aberrant chromosome behavior in maize endosperm. Amer. Jour. Bot. 8: 411-424. 1 fig. 1921.—The author gives genetic evidence to show that colorless-aleurone spots in aberrant seed of maize are due to aberrant chromosome behavior and not to irregularities in the fusion of the 2nd sperm nucleus. This is shown by pollinating a plant of the composition $cw_2 cw_1$ (colorless and waxy) by one of the composition $CW_2 CW_1$ (colored and corneous); the endosperm from such a cross would have the composition $ccCw_2w_1W_2$. Of 23,875 seed produced, 58 were aberrant, having colorless spots in otherwise colored aleurone. In 55 of the aberrant seed the colorless-aleurone spots had waxy endosperm directly underneath. This colorless aleurone is regarded as due to the absence of C , and the waxy to the absence of W_2 . The author points out that inasmuch as C and W_2 are carried on the same chromosome and that colorless and waxy are associated in these spots, non-disjunction probably occurred at some stage in the development of the endosperm. A mutation or an irregularity in the fusion of the 2nd sperm nucleus would not explain the situation in this case. Additional evidence of the same nature is presented in respect to the factors I and S_1 , which are located on the same chromosome as W_2 and C .—Further evidence shows that when aleurone and endosperm factors are not linked the recessive spots are underlaid or over-laid by the dominant condition of the male parent.—G. N. Stroman.

1337. EMERSON, R. A. Heritable characters in maize: IX. Crinkly leaf. *Jour. Heredity* 12: 267-270. 3 fig. 1921.—A type of maize characterized by semi-dwarf habit and crinkly and more or less lobed leaves is described. Data indicating inheritance of this character as a simple Mendelian recessive are given.—*R. A. Emerson.*

1338. EMERSON, R. A., W. H. EYSTER, E. G. ANDERSON, and M. DEMEREK. Studies of somatic mutations in variegated maize pericarp. I. Relative frequency of dominant somatic mutations in homozygous and in heterozygous variegated pericarp. II. Frequency of mutation in relation to development. III. An interpretation. [Abstract.] *Anat. Rec.* 23: 90-91. 1922.—It has been pointed out that homozygous material, having the recessive variegation factor duplex, might be expected to mutate twice as frequently as heterozygous material having that factor simplex. Results are here reported showing on the contrary that somatic mutations occur consistently with greater frequency when the variegation factor is simplex than when it is duplex. Tabulation of progenies derived from a gene for variegation shows a high frequency of mutation in both directions, i.e., to self-color and to white. A gene for light variegation mutates frequently to white but rarely to self-color. A gene for dark variegation mutates rarely to white but frequently to self-color. The self-color derivative shows occasional reverse mutations to variegated. The mutations from variegated to self-colored affect both the germ cells and somatic tissue. The effects of a mutation on the somatic tissue of pericarp and glumes is visible as a colored area. The small colored areas are supposed to be due to mutations occurring relatively late in ontogeny, earlier mutations giving rise to larger colored areas. If mutability remains constant the frequency of observed mutant areas of each size should be roughly proportional to the relative number of cells present at the respective stages at which the mutations occurred. Calculations of about 45,000 observed mutant areas of different sizes show a great increase in mutability in the later stages. This is believed to be causally related to increasing differentiation.—*R. A. Emerson, W. H. Eyster, E. G. Anderson, and M. Demerec.*

1339. ERDMANN, RHODA. Endomixis and size variations in pure-bred lines of *Paramecium aurelia*. *Arch. Entwicklungsmech.* 46: 85-148. 12 fig. 1920.—A study is made of the changes in size and size constants during the intervals between endomixis (intermictic periods) in *Paramecium aurelia*. When a pure line undergoes endomixis, heritably different lines exhibiting greater or less differences in size arise; these breed true and the ensuing environmental conditions determine which shall survive and which shall be killed off. If the environmental conditions remain constant those lines which exhibit the same characteristics as the original line before endomixis tend to survive. In other words, if the environmental conditions remain constant, the mean size of the race remains constant even though many periods of endomixis take place. The inability of previous investigators to obtain size differences by selection in asexually conducted lines of *Paramecium* is ascribed to the fact that selections were not made immediately after endomixis, which according to the author is the only time in which selection would be expected to give results. The paper is concluded with the statement that in *Paramecium*, as in *Difflugia*, heritable variations arise in asexually conducted lines where intermingling with foreign chromatin material cannot take place. "The rigid conception of the genotype does not hold true for Protozoa."—*W. H. Talloferro.*

1340. FALKENHEIM, CURT. Der Einfluss der sozialen Lage auf die Sterblichkeit des Kleinkindes in Königsberg Pr. während der Jahre 1914-1918. [The influence of social position on infant mortality in Königsberg Pr. during the years 1914-1918.] Aus dem Hygienischen Inst. Albertus-Univ.: Königsberg, Pr. 1920.—At the end of 1914 and the beginning of 1915 Königsberg experienced a very high infant mortality as the city was a refuge for fugitives, who brought diseases. Up to the 2nd year mortality is relatively high, after which resistance develops and mortality drops noticeably. Infectious diseases cause highest mortality, lung troubles less, and illnesses due to nutritive conditions still less. From the 1st to 5th year of life, for every 10,000 living, 291 die among those well off economically, 431 among the middle class, 496 among petty officials, 801 among workmen receiving up to 15,000 marks, 1266 among

workmen receiving up to 900 marks, and 1451 among unmarried. Hence social position as measured by income determines infant mortality. From the 3rd year on illegitimate children suffer no higher mortality on the average than legitimate.—*P. W. Whiting.*

1341. FIRKET, J. On the origin of germ cells in higher vertebrates. *Anat. Rec.* 18: 309-316. 1920.—In birds the author finds 2 generations of germ cells. Most "primary" germ cells degenerate and "secondary," or definitive, germ cells come from germinal epithelium. A few ova or spermatogonia may come from primary cells because at one stage primary and secondary germ cells are indistinguishable.—In the albino rat primary germ cells are distinguished from indifferernt germinal cells by their large size and by shape and position of mitochondria. By these means it is shown that primary germ cells disappear before secondary ones appear. The author concludes that primary germ cells disappear earlier in mammals than in birds, hence should be regarded as cells in "phylogenetic regression."—*T. S. Painter.*

1342. FRAENKEL, MANFRED. Röntgenstrahlenversuche an tierischen Ovarien zum Nachweis der Vererbung erworbener Eigenschaften und ihre Beziehungen zum Krebsproblem. [X-ray experiments on animal ovaries to determine the inheritance of acquired characters and their relation to the cancer problem.] *Strahlentherap.* 12: 272-290. 1921.—The author reviews briefly the effect of X-rays in therapy, on menstrual bleeding and dysmenorrhea, and considers the value of this as evidence bearing on the weakening of the egg. In adult guinea-pigs the rayed ovary decreases in size and the elevations and rupturing follicles observed in the untreated ovary of the same animal are not visible. The reproductive power of adult females is, then, badly deranged by X-rays. Young animals are quite different; a ventral dose 8-20 times as great as that used in adults impairs growth of animals but does not affect fertility, as shown by the fact that pregnancy is afterwards obtained.—The author outlines a program for proving the presence and inheritance of an "acquired" character and gives a long historical review of investigations on the subject.—In the experimental work a female guinea-pig 4 days old was rayed on the head with 2 E. D. X-rays for $\frac{1}{2}$ hour. Besides retarding growth there was loss of hair from the head. The reproductive activity was not affected. Descendants of this treated female covered by an untreated male were markedly smaller than controls—sterility was present in some cases. Bald spot was also present in all descendants (numbers small). No report is given of abnormalities through male line only. In the case of the sterile animals examination showed cystic degeneration of the ovaries.—*C. C. Little.*

1343. FRETS, G. P. Heredity of head form in man. *Genetica* 3: 195-400. 9 fig. 1921.—The author reports a Mendelian study of inheritance of cephalic index, based on 3600 persons belonging to 360 families. These show large non-hereditary variability. Children show segregation and sometimes as a whole have higher or lower indices than parents. Brachycephaly is more or less dominant; factors that decide dominance of brachycephaly or dolichcephaly are size of head and prepotence of parents. Variability of children of parents with medium indices is higher than that of children of parents with high or low indices.—*John Rice Miner.*

1344. FRIEDENTHAL, HANS. Über die Bildung der menschlichen Geschlechtszellen und die Vorgeschichte der menschlichen Leibesentwicklung. [On the formation of the germ cells of man and preparatory stages of development of the human body.] *Arch. Rass. u. Ges. Biol.* 13: 257-276. 1921.—The author discusses in an elementary way the history of the germ cells of man (both sexes), beginning with the fertilized egg and ending with mature germ cells. Emphasis is given to sex determination by chromosomes, the maturation of male and female germ cells, and the facts of fertilization.—*T. S. Painter.*

1345. GATES, R. RUGGLES. Mutations and evolution. *Nature* 107: 714-715. 1921.—In this explanatory article the writer points out that embryonic characters showing recapitulation could not well have arisen by chance mutations in the germ-plasm but must have arisen according to the principle of inheritance of acquired characters.—*L. R. ll'aldron.*

1346. GEISER, S. W. Observations on sex in the top-minnow, *Gambusia affinis*. [Abstract.] Anat. Rec. 23: 112. 1922.—Field collections of *Gambusia* and other viviparous poeciliid teleosts almost invariably show a great preponderance of females. Experiments with litters of *Gambusia* raised in aquaria, with low mortality-rates, show the proportions of the sexes at birth to be approximately equal. The adult males have a higher death-rate than the females, thus producing a minority of males in adult populations. The gonads of the sexes at birth are indistinguishable from each other. They differentiate at ages of 3 weeks to over 1 year, depending upon environmental conditions. Temperature and food largely determine the rate of development. In the author's experimental litters, all gonads were differentiated in less than 4 weeks, so that ascertainment of sex was possible. Cytological study shows a fairly close correspondence between the degrees of differentiation and of the development of the anal fin (in the male) into an "intromittent" or copulatory organ (gonopod). With favorable environment, the gonopod is developed in 95 per cent of the individuals within the first 3 months, but this development may be delayed till the fish is over 1 year old. The males in early stages (first 1½-2 months) grow in length and weight faster than the females. Total length in both sexes is trebled to quadrupled in the first 3 months. Females born in May or June bear their 1st litters when 8-10 weeks old. The chromosomes in soma and germ-cells are exceedingly small; the spermatogonial number appears to be 36.—S. W. Geiser.

1347. GELEI, J. Weitere Studien über die Oogenese des Dendrocoelum lacteum. II. Die Längskonjugation der Chromosomen. [Further studies on oogenesis of *Dendrocoelum lacteum*. II. The longitudinal conjugation of the chromosomes.] Arch. Zellf. 16: 88-169. 6 pl., 6 fig. 1921.—The chromosome complex in the oogonia is made up of 7 pairs of chromosomes. After the last oogonial division the oocyte nuclei are formed without the appearance of a longitudinal split in the chromosomes. When the oocyte has increased considerably in size a spireme of distinct loops in the diploid number appears, the loops later becoming oriented to form the leptotene bouquet. At this time the chromosomes are about 4 times as long as in the oogonia and are present in pairs as shown by measurements. This orientation brings the synaptic ends of the chromosomes together in a small area, the loops become more or less parallel, and parasympapsis then takes place beginning at one end. Although the loops of the same length are often distant from each other with other loops intervening, the chromomeres of one chromosome come to lie opposite the chromomeres of its synaptic mate. At the same time a shortening and thickening of the loops takes place. The free ends of the partially synapsed loops are always of equal length and contain the same number of chromomeres. During the diplotene bouquet a secondary longitudinal split appears but persists for only a short time. In the 1st maturation division homologous chromosomes are separated. There is present 1 or more nucleoli, usually attached to the end of any chromosome. These are thrown into the cytoplasm during the 1st division. The author concludes that the 2 loops which synapse represent homologous paternal and maternal chromosomes which are made up of a like series of linearly differentiated materials. The individuality of the chromosomes is further shown by their ability to move and the remarkable impulse of homologue to seek out and conjugate with homologue.—R. L. King.

1348. GEROULD, JOHN H. Blue-green caterpillars: The origin and ecology of a mutation in hemolymph color in *Colias* (*Eurymus*) philodice. Jour. Exp. Zool. 34: 385-415. 1 pl. 1921.—Mutation changing hemolymph of larva, pupa, and adult from grass-green to blue-green acts as a simple Mendelian recessive. This was brought to light by inbreeding from a wild heterozygote. The mutation affects many characters. The egg from a recessive female is alabaster white instead of cream white. The larva shows blue color after second moult and the pupa is bluish. The larva lacks a pink lateral line, which is therefore a dominant character. The pupal cuticula is white instead of pale brownish yellow. The eye of the adult is bluish "mineral green" instead of yellowish "apple green." Silk cocoons spun by Braconid larvae feeding on blue-green caterpillars are white instead of golden yellow. The xanthophyll, yellow component of chlorophyll, is probably broken down by the recessive gene, or hereditary chromosomal enzyme, acting locally from nuclei of cells of intestinal epithelium upon digested

leafgreen during its absorption into the hemolymph. This local action may explain the numerous effects which are all due to a reduction or elimination of xanthophylloid pigment. A recessive factor here determines the presence of a decolorizer that attacks xanthophyll, while a dominant determines its absence. The presence-absence hypothesis must therefore be inverted. Lamarckian factors may reach genes by way of the blood. English sparrows found the blue-green caterpillars an easy mark, leaving the grass-green untouched. The mutant larva is as vigorous and disease-resistant as the normal, but the adult is less active and less inclined to mate. A simple dominant Mendelian difference affects wing color of adult females, changing it from yellow to white; character of the males is unaffected. The color determiner for this is also in the blood, which flows out into the scales as the wings are formed. Wing pigment is unaffected by blue-green mutation and is unrelated chemically, being a uric acid derivative. The paper concludes with a discussion of the relation of similar pigments in plants and animals, and mutation in the blood pigment of the silkworm.—*P. W. Whiting.*

1349. GEROULD, JOHN H. Olive, a mutation in *Colias philodice*. [Abstract.] Anat. Rec. 23: 95. 1922.—Olive-green caterpillar color is recessive to normal grass-green. The eye of the butterfly developed from an olive-green caterpillar is not normal yellow-green, but olive-green. That the recessive gene probably adds to the normal grass-green hemolymph an orange pigment, not yet detected in the blood itself, or at least a determiner of such pigment, is demonstrated by the fact that certain wing scales of the mutant butterfly always show a peculiar orange or buff pigmentation, not normal in this species. This orange pigmentation is most marked on the under surface of the hind wings and of the tip of the fore wings, parts most directly exposed during wing development in the pupa to the action of the hemolymph. The orange-producing gene for "olive," acting through the blood upon the grass-green pigment derived from chlorophyll and passed on by the blood to the hypodermis of skin (larva) and eye (butterfly), turns this pigment olive-green; the altered hemolymph, acting upon the wing scales, turns the latter orange. This gene interacts with another recessive factor, viz., that for blue-green blood and caterpillar color, to give a 9:3:4 ratio (9 grass-green, 3 olive-green, 4 blue-green). The delicate purple sheen appearing in the skin of certain blue-green caterpillars (with blue-green blood) probably indicates the presence and action in them of the recessive olive factor. "Olive" X "olive" breeds true, but certain individuals heterozygous for blue-green produce 25 per cent of blue-green caterpillars.—*John H. Gerould.*

1350. GLEISBERG, WALTHER. Auffallende Typenbildung bei *Vaccinium oxyccoccus* L. [Remarkable type formation in *Vaccinium oxyccoccus*.] Ber. Deutsch. Bot. Ges. 37: 489-496. Fig. 1-4. 1919.—Several types of *Vaccinium oxyccoccus* were found which varied greatly in habit of growth, and size and color of fruit.—*Karl Sax.*

1351. GOLDSCHMIOT, R. The determination of sex. Nature 107: 780-784. 1921.—The problem is two-fold: (1) Nature of mechanism which determines sex; and (2) essential difference in the 2 individuals thus separated and the action of such difference in directing individual development. It has been shown that sex may be and is distributed in the offspring in terms of Mendelian symbolism. Cytological studies have shown that the chromosome complex commonly furnishes a plausible physical basis for the explanation of sex distribution as it occurs. Non-disjunction, with attendant cytological studies, has practically demonstrated that X-Y chromosomes are physically responsible for sex determination. Phenomena of "intersexuality" in gypsy-moth furnishes basis for attack on the second problem indicated above.—When a South European female is crossed with a Japanese male, all resulting males are normal but all females are intersexual and are of different grades, from weak, through strong to complete (phenotypically) males, dependent upon the "strength" of the male parent or, *pari passu*, upon weakness of the female parent. Intersexuality thus depends upon the interworking of 2 parental variables.—Breeding tests showed strength to follow the X-chromosomes, and it is therefore a property of a Mendelian sex-factor. "Weakness" is inherited purely maternally. Thus ordinary Mendelian explanation is not possible and an assumption of factorial valency seems warranted. A constant quantity of a factor for femaleness interacts

with a variable quantity of a factor for maleness, for a defined set of conditions. Intersexual females developed as females to a certain stage but further development was entirely male, and *vice versa*. Final condition of intersexuality is conditioned by, and inversely proportional to, position or date of turning point in development, and is dependent upon certain dosages of sex factors.—“Sex-factors are substances which cause, take part in, or accelerate a reaction in proportion to the quantity present.” The velocity of reaction is proportional to the quantity or concentration of the reacting substance present. The reaction itself is due to the production and presence of specific hormones of sexual differentiation. Hormonic production may affect tissues generally, as in insects, or it may be limited to interstitial tissue of sex glands, as in higher vertebrates as shown in production of free-martins.—Various complicated sexual phenomena can be made to fall easily into line with foregoing explanation. An instance of this is cited in the worm *Bonellia*, where sex is influenced by rates of differentiation of growth so that the male hormones may or may not act. Quantitative ideas of sexual differentiation may probably be applied to the theory of heredity in general.—*L. R. Waldron.*

1352. GOODALE, H. D. Changes in egg production at the Massachusetts Agricultural Experiment Station. [Abstract.] Anat. Rec. 23: 99-100. 1922.—A history of the steps taken to date is presented. Egg production has been increased by selection, based on the consideration that at least 5 major components can be recognized in 1 egg record, namely maturity, winter pause, broodiness, intensity, and date of last egg. Thus far, attention has centered on decreasing the average age at which the 1st egg is laid, the decrease being 58 days, with corresponding increase in winter production. Broodiness has also been reduced. The mean annual production has been increased from 121 to 185 eggs.—*H. D. Goodale.*

1353. GOODALE, H. D. Data on the inheritance of spurs in female fowl. [Abstract.] Anat. Rec. 23: 94. 1922.—By selection, a race of fowls having spurred females has been produced. Two of these were crossed with a race (Cornish) in which the females are never spurred; F_1 is spurless. Segregation occurred in F_2 , the ratios indicating more than 1 set of Mendelian factors.—*H. D. Goodale.*

1354. GOODRICH, EDWIN S. Some problems in evolution. Science 54: 520-538. 1921.—Inheritance is the reappearance in offspring of a character possessed by the parent. For this reappearance, cooperation of the same germinal and same environmental factors must occur in both offspring and parent. All characters are a result of response to environment. Alteration of either germinal or environmental factors produces new characters. Distinction must be made between transmission and inheritance; factors are transmitted, characters never. Variation is the difference between an individual and the mean of the group. Some variations (mutations) are due to germinal changes, and these are inherited; other variations (modifications) are due to environmental changes, and these are inherited if the environmental changes persist. The terms mutation and modification must not be applied to characters themselves. Some environmental factors are internal to the organism as a whole, such as temperature regulation. Characters are regularly inherited if dependent on environmental factors regularly present, but are not regularly inherited if environmental stimuli may or may not be present. Principal problem left unsolved is the nature of germinal factors, and origin of differences between them. Germinal factors must be self-propagating substances. Their relation to metabolism is the fundamental problem; Guyer's serum experiments are discussed in this connection. Evolution is a series of metabolic changes in living matter molded by environment. The question whether mind or physical structure is more important in evolution is meaningless, since mental evolution and physical evolution occurred simultaneously. The statement that instinctive behavior is inherited and acquired behavior not, is misleading; the former is, the latter may or may not be, inherited.—*A. Franklin Shull.*

1355. GOWEN, JOHN W. The correlation between the butter-fat percentage of one lactation and succeeding lactations in Jersey cattle. Maine Agric. Exp. Sta. Bull. 291. 145-156. 1920.—The substance of a longer paper [see Bot. Absts. 7, Entry 198] is reported.—*G. H. Shull.*

1356. GRAY, J. Relation of spermatozoa to certain electrolytes. Proc. Roy. Soc. London B 91: 147-157. 1920.—It is shown that spermatozoa (of *Echinus milletis*) behave much like negatively charged colloids, such as albumens, in their reaction toward electrolytes. They agglutinate and are precipitated from suspension by the trivalent metal ion cerium. This reduces their surface charge to near the isoelectric point and makes agglutination possible. The hydrogen ion changes the surface charge so rapidly over to the positive side that no agglutination can be obtained. Sodium citrate causes the agglutinated spermatozoa to return to suspension by lowering the pH of the solution and thus restoring the negative charge.—It is suggested that the relative surface charge of egg and spermatozoon may play some role in fertilization, and that some of the problems of artificial hybridization and the fertilizing power of spermatozoa may find an explanation in a study of surface charges.—*Harvey M. Smith.*

1357. HARRIS, J. ARTHUR. Tissue weight and water content in a tetra-cotyledonous mutant of *Phaseolus vulgaris*. Proc. Soc. Exp. Biol. and Med. 18: 207-209. 1921.—Mean green weight and mean dry weight of primordial leaf tissue per plant and per leaf in the mutant were lower than in the normal. The differences between abnormal and normal plants decrease as the number of primordial leaves on abnormal plants increases. The author holds that the results substantiate the idea of an association between physiological differences (as measured by capacity for production of tissue) and morphological differences.—*C. M. Woodworth.*

1358. HEALY, JAMES J. Retinitis punctata albescens. British Jour. Ophthalmol. 5: 18, 1 pl. (colored). 1921.—The author presents a clinical report of the disease and intimates that it probably occurred in a brother, the mother, and several members of the mother's family but not in the paternal connection.—*Howard J. Bunker.*

1359. HEGNER, R. W. Heredity and evolution in Protozoa. Sci. Prog. 14: 608-624. 2 fig. 1920.—This is a review of the recent work on inheritance in protozoa by Jennings and his collaborators. Particular attention is directed toward the work of (1) Middleton on fission rate in *Styloynchia pustulata*, (2) Jennings on shell size, spine number, spine length, and number of teeth in *Difflugia corona*, (3) Root on spine number, shell size, shell form, and mouth size in *Centropyxis aculeata*, and (4) Hegner on shell size, spine number, shape of mouth, and size and number of nuclei in 4 species of *Arcella* [see Bot. Absts. 2, Entry 676]. These investigations demonstrate that heritably diverse branches can be isolated by selection from the asexual descendants of a single specimen. Furthermore, these diverse branches resemble the diverse strains found in nature and the latter may have arisen in a similar manner. Hegner's work also indicates that there is a definite correlation between the quantity and distribution of chromatin within the cell and the external heritable characteristics. [See also Bot. Absts. 6, Entry 744.]—*W. H. Taliaferro.*

1360. HERTWIG, GÜNTHER. Das Schicksal des väterlichen Chromatins im Kreuzungsversuch. [The fate of paternal chromatin in the crossing experiment.] Arch. Mikrosk. Anat. 94: 288-302. 1 fig. 1920.—The author reviews the literature concerning chromosomes of hybrids. In some such hybrids, sperm chromatin fails to swell in the egg and remains functionless (heterogeneous crosses of sea urchins and mollusks or worms). In others sperm chromatin starts to function properly but is eliminated later (sea urchin and annelid). Even closely related species form hybrids having only maternal chromosomes (toads). Gonomery in fish hybrids is a similar phenomenon, separation of maternal and paternal chromatin extending far into the blastula stage. In Baltzer's echinoderm crosses some paternal chromosomes survived, but most of them escaped the spindle, collected in the cytoplasm, and set up a disturbance; none of these could be followed into late stages. That the presence of paternal chromosomes caused the disturbance was shown in other crosses (G. and P. Hertwig) by treating sperm with radium, thereby inactivating the paternal chromosomes, after which normal development with haploid number of chromosomes took place. Various investigators have observed that germ cells of hybrids undergo abnormal processes. This is especially apparent if the parents differed in chromosome number or shape. Hybrids of *Drosophila*, the parents of

which had 20 and 10 chromosomes respectively in mature germ cells, had 30 in early germ cells. Of these, 20 formed 10 bivalent chromosomes and 10 remained single and went irregularly to either pole. In some other cases conjugation occurs in an irregular number of chromosomes. In others, conjugation is usually wanting, as in the lepidopterous *Pygaera*, in which a hybrid having 59 chromosomes (30 + 29) produces germ cells having 59 chromosomes. Mating this hybrid with parent having 30 (haploid) gives a back-cross hybrid with 89, in the maturation of which about 30 bivalent chromosomes are formed. Such phenomena probably cause abnormalities of Mendelian segregation and are responsible for intermediate hybrids.—*A. Franklin Shull.*

1361. HERTWIG, GÜNTHER. Das Sexualitätsproblem. [The problem of sexuality.] Biol. Zentralbl. 41: 49-87. 1921.—Two problems are involved,—the nature of sex, and cause of sex differentiation. As to the nature of sex, gametes are held to be sexually differentiated even when visibly alike. Sex differentiation of nuclei has not been demonstrated. Fertilization is not a necessity, but a possibility to all living matter under certain conditions. There is, sexually, only one kind of substance in the nucleus, capable of reacting either as male or as female. Paternal chromosomes are male, maternal ones female, but conjugation of chromosomes cancels this distinction and thereby causes their separation in reduction. Failure of chromosomes to conjugate results in omission of reduction. Sex differentiation of gametes causes fusion of nuclei on fertilization, but only in cases where the haploid phase is of long duration do chromosomes conjugate immediately after fertilization. Sex differentiation involves several problems, those of male and female gametes, of sex organs in haplonts, of male and female entire haplonts, of sex organs in diplonts, of secondary sexual characters, and of male and female entire diplonts. The more complicated an animal's structure is, the more of these problems are involved. The article reviews representative work on sex-determining influence of external and internal factors. The explanation is based on genes *M* and *F* of different potencies. In plants with mixed sexes *M* and *F* are equal, and external factors decide sex. In dioecious organisms one gene has predominating influence, and external conditions may have no effect. Cytoplasm is given sex-differentiation by the nucleus, and may become so firmly fixed that changes in the nucleus due to reduction have no effect. External factors act, not directly upon nucleus and chromosomes, but through the cytoplasm. The fact that reduction so often has an important bearing on sex determination, and that external conditions affect sex similarly in single cells and in whole organisms, leads to the hope that a single fundamental explanation of sex may be discovered.—*A. Franklin Shull.*

1362. HERWERDEN, M. A. VAN. [Dutch rev. of: HAECKER, V. Über weitere Zusammenhänge auf dem Gebiete der Mendelforschung. [On further correlations in the field of Mendelian investigation.] Pflügers Arch. Gesam. Physiol. 181: 149-169. 1920 (see Bot. Abst. 8, Entry 1916).] Genetica 3: 544-546. 1921.

1363. HERWERDEN, M. A. VAN. [Dutch rev. of: STIEVE, H. Über den Einfluss der Umwelt auf die Eierstücke der Tritonen. Ein Beitrag zur Frage nach der Vererbbarkeit erworbener Eigenschaften und der Parallelinduktion. [Influence of environment on the ovary of the Triton. A contribution to the question of the inheritance of acquired characters and of parallel induction.] Arch. Entwicklungsmech. Org. 49: 179-267. 2 pl. 1921.] Genetica 3: 550-552. 1921.

1364. HOFFMANN, HERMANN. Zum Problem der Vererbung erworbener Eigenschaften. [The problem of inheritance of acquired characters.] Med. Klinik 15: 583-586. 1919.—There is a sensitive period in the life of some animals, e.g., pupa stage of the beetles in Tower's experiments, in which the animal is easily influenced by outside agencies. It seems that in this stage characters can be acquired which are then hereditary; the length of this period in animals is possibly inversely proportional to their complexity, which would explain the lack of success in experiments with higher vertebrates.—In human psychical faculties the inheritance of acquired characters is very probable. If one special "Anlage" is much used through

many generations it improves and develops and may appear finally as a great talent. The quick reaction of a child to the outside world results from an inherited faculty which originally must have been, to a certain degree at least, acquired.—Some constitutional abnormalities e.g., haemophilia and polydactylism, are hereditary, but their origin is unknown; also the origin of most psychical afflictions is unknown. It is possible that the "Anlage" for a mental disease may grow stronger through the influence of outside conditions, and be transmitted in a more acute form. Through some particularly intensive experience such an "Anlage" may appear for the first time. Taking everything into consideration the author regards the human species as relatively constant.—*B. Whiteside.*

1365. HOGBEN, LANCELOT T. On certain nuclear phenomena in the oocytes of the gall-fly *Neuroterus*. *Jour. Linnean Soc. Zool.* 34: 327-333. 1920.—Reference is made to unique type of oogenesis which has been reported in Hymenoptera. An agamic generation of *Neuroterus* was studied. Twenty chromosomes occur in wings, nervous system, and follicular epithelium; but in the hypoderm are clear cases of 30 and 10. Two types of ovogenesis are shown: A male-producing type, undergoing maturation; and a female-producing type without polar bodies. No differences indicative of these 2 types were found in young oocytes. In newly hatched flies oocytes show telosynapsis into 10 pairs of chromosomes followed by condensation and arrangement into metaphase; shortly afterwards condensation into oval compact nucleus follows. There is then an interruption of the maturation process until after oviposition, when separation of polar chromosome groups occurs.—*P. W. Whiting.*

1366. HONING, J. A. Kruisingproeven met Deli-Tabak. [Experiments on hybridization with Deli tobacco.] *Mededeel. Deli-Proefsta. Medan.* II, 10. 1-41. 1920.—Detailed statistical data and observations are reported on F_1 , F_2 , and F_3 of crosses between several previously isolated strains, with respect to number of leaves per plant, length of leaf, width of leaf, ratio of width to length of leaf, time of flowering, and the percentage yields of the various commercial grades of cured and fermented leaf. The tests were conducted on several estates, representing different types of soils. In some instances reciprocal crosses were studied. The cross of the light-colored line 1, producing long leaves with a broad base and showing a light color after fermentation, with the fallow-colored line 3, yielding shorter leaves of darker color when fermented, gave a uniform intermediate F_1 progeny. In F_2 and F_3 segregation into intermediates and types resembling each of the parents was observed. None of the hybrids was consistently superior to light-colored line 1 in color or quality as grown on different soil types. F_1 of a cross of light-colored line 1 with the light-fallow line 72 (which produces leaves in greater number and with narrower-base and more fallow color) was intermediate in number of leaves per plant. F_2 did not differ from line 1 in mean length and breadth of leaf. On certain estates the percentages of fallow tobacco were higher for the hybrids than for line 1. Evidence of coupling in inherited characters was observed, a broad leaf-base, for instance, being correlated with early flowering. In F_1 and F_2 of light-colored line \times line 774 (characterized by high number of leaves, narrow leaf-base, and late flowering) the lower number of leaves of line 1 was dominant. Most F_3 individuals resembled line 1 in length of leaf and line 774 in width of leaf. Results with respect to width of leaf suggest independent Mendelian segregation for 2 factors which results in dominance of narrow leaf-base to broad leaf-base. In time of flowering F_3 was intermediate. The crosses, fallow line 3 \times line 774 and its reciprocal, behaved in the same way as the crosses between line 774 and line 1.—*W. W. Garner.*

1367. HOPKINS, HOYT S. The conditions for conjugation in diverse races of *Paramecium*. *Jour. Exp. Zool.* 34: 339-384. 1921.—Different strains of the same species of infusoria may display different degrees of readiness to conjugate when grown under similar environmental conditions or subjected to the same experimental conditions. These different strains as well as the different species exhibit different but more or less constant time intervals between successive epidemics of conjugation. Some strains exist which do not conjugate for long periods. Prolonged cultivation under laboratory conditions tends to suppress conjugation.

The author discusses in detail various experimental procedures, such as the addition of certain salts to the media, which in certain strains restore the readiness to conjugate. Conjugation is initiated by a period of unregulated division, and the effect of salts on the readiness to conjugate may be due to their effect on the rate of fission. The periodic appearance of conjugation in *Paramecium* may also be brought into relation with the periodic fluctuations in the fission rate of the organisms.—*W. H. Taliaferro.*

1368. HORNING, BENJAMIN, and HARRY BEAL TORREY. Hen feathering induced in male fowls by feeding thyroid. [Abstract]. Anat. Rec. 23: 132. 1922.—When fed thyroid daily, in doses increasing with their weight, from the age of 3 weeks, male Rhode Island Red chicks developed plumage of the female type, although males of this breed ordinarily do not pass through a juvenile stage characterized by plumage of the female type. The plumage of capons, usually ultra-male, is not affected by thyroid feeding. Castrated females, which typically develop male plumage, are similarly unaffected. The primary effect of the thyroid feeding seems to be to increase the activity of the "lutear" interstitial tissue of the testis. The end result is a hen-feathered male resembling in all essential characteristics of the plumage the hen-feathered males of the sea-bright bantam and campine breeds.—*Benjamin Horning and Harry Beal Torrey.*

1369. HUBBS, CARL L. Variations in the number of vertebrae and other segmental characters of fishes correlated with the temperature of the water during development. [Abstract.] Anat. Rec. 23: 100. 1922.—The author and Johannes Schmidt have obtained, independently, a large volume of experimental and observational evidence indicating that the meristic characters displayed by an individual fish are determined not alone by heredity, but in part also by the environmental conditions, notably temperature, which prevail during some sensitive developmental period. They have further demonstrated that altered environmental conditions induce differences highly similar to those which characterize local races in fishes, some of which have been proved genetically distinct. For example, differences induced by cold are in the same direction as those characterizing races inhabiting cold water.—*Carl L. Hubbs.*

1370. HUTCHISON, C. B. The linkage relations of the factors for shrunken endosperm *Ssh*, waxy endosperm *Wx wx*, and the aleurone color factors *Cc* and *Ii* in maize. [Abstract.] Anat. Rec. 23: 90. 1922.—It has been shown previously by others and the writer that the factors for waxy endosperm, *W_x w_x*, and shrunken endosperm *S_A s_A*, and 2 of the factors concerned in aleurone color, *Cc* and *Ii*, in maize are linked. Results are here reported from 2 back-cross experiments, one involving shrunken and waxy endosperm and the *Ii* color pair, the other shrunken and waxy endosperm and the *Cc* color pair, which are interpreted as showing that the order of the genes are *I S_A W_x*, and *C S_A W_x*. The per cent of crossovers between *I* and *S_A* is practically the same as that between *C* and *S_A*; *C* and *I* must therefore be allelomorphic or very closely linked.—*C. B. Hutchison.*

1371. HYDE, ROSCOE R. Effect of temperature upon the development of the eye of (variable), a mutant from *Drosophila hydei*. [Abstract.] Anat. Rec. 23: 93. 1922.—Eggs from a new eye mutant, variable, from *Drosophila hydei* (Sturtevant) when developed under warm, dry conditions give rise to flies with very small eyes—some individuals may be eyeless. Eggs subjected to a temperature below that of the living room and well supplied with moist food yield flies with large eyes indistinguishable from the wild type. The eyes of the wild stock from which the mutant came are not modified by changes in temperature. The new eye character is a non-sex-linked recessive and shows linkage with scarlet, another mutant of this species. The 2 characters show crossing over in the female but not in the male.—*Roscoe R. Hyde.*

1372. IBSEN, HEMAN L. A cross in guinea pigs best explained by assuming 75 per cent crossing over. [Abstract.] Anat. Rec. 23: 96. 1922.—The factors involved are *P*, dark-eyed,

p, pink-eyed; *C_r*, non-yellow, *C_a*, alhino; *e^p*, tortoise, partial extension of black, *e*, non-extension of black. Two crosses were made: (1) A pink-eyed self-white, *pp ee C_r C_r*, was crossed with a "dark-eyed" albino, *PP ee C_a C_a*, and the dark-eyed self-white offspring, *PP ee C_r C_a*, were inbred, producing 120 dark-eyed self-whites and 64 which were either albinos or pink-eyed self-whites. (2) A pink-eyed self-white, *pp ee C_r C_r*, was crossed with a "dark-eyed tortoise" alhino, *PP e^p e^p C_a C_a*, and the dark-eyed non-yellow tortoises, *Pp^p e^p C_r C_a*, were inbred, producing 51 dark-eyed non-yellow tortoises, 6 pink-eyed non-yellow tortoises (*pp e^p C_r*), 16 dark-eyed self-whites (*P^p ee C_r*), and 38 pink-eyed self-whites or albinos. The 1st cross was made to determine whether a 9:7 ratio would be obtained in the *F₂*; and the 2nd, whether a 27:8:9:19 ratio would be obtained. Neither was closely approximated. However, by assuming that *P* and *C_r* were linked, and that 75 per cent crossing over took place in both sexes, it was found that the theoretical ratio (41 dark-eyed : 23 pink-eyed or albinos) fairly closely approached the observed ratio. If in addition it is assumed that *e^p* was not linked to the other 2 factors, the theoretical ratio for the 2nd cross (123 dark-eyed non-yellow tortoises:41 dark-eyed self-whites : 21 pink-eyed tortoises : 71 pink-eyed whites or albinos) was also found to be fairly close to the observed ratio. This hypothesis is tentative; final proof can be obtained only by mating the heterozygotes back to recessives.—*Heman L. Ibsen*.

1373. JEGEN, G. Zur Spermatogenese bei *Apis mellifica*. [Spermatogenesis in *Apis mellifica*.] Verhandl. Schweiz. Naturf. Ges. [100 Jahresvers.] 1919: 119-120. 1920.—The author compares normal drones from queen eggs with abnormal drones from worker eggs. His results from study of spermatogenesis of normal drones agree with earlier conceptions except that small spermatids or second polar bodies are transferred to the receptaculum seminis of the female during mating and there serve as male-determining elements in fertilization. Second maturation division therefore is differential for sex and normal drones result from fertilized eggs. Abnormal drones from worker eggs are sterile as has been shown experimentally. Chromosomes are the same as in the normal (16) but no cytoplasmic bud is cut off at the 1st maturation division. A 2nd maturation division progresses to a certain extent but spermid degenerates. Parthenogenesis arises therefore in the bee colony only under abnormal conditions.—*P. W. Whiting*.

1374. JENNINGS, H. S. [Rev. of: RITTER, WILLIAM EMERSON. The unity of the organism. 2 vol., 14×20 cm., ix+398 and ix+408 p., 81 fig. Richard G. Badger: Boston, 1919 (see Bot. Absts. 4, Entry 720).] Phil. Rev. 30: 616-621. 1921.

1375. JONES, D. F. Hybridization in plant and animal improvement. Sci. Monthly 14: 5-23. 6 fig. 1922.—*Dahlia*, introduced into Europe from Mexico, was in general cultivation in 1879. The flowers were simple and similar to *Cosmos* and *Coreopsis*. The first double flower and 12 well-marked color types were reported in 1884. Twelve years later there were 60 varieties due to combinations of colors and double condition brought out by crossing and doubtless by mutations also. The 1st *Cactus Dahlia* came to light in 1879. The pompon was discovered as a 4th type. Double Dahlias are classed as show and fancy according to color pattern. It is not known how the individual variation arose in most cases, but by combinations of these more than 3,000 named varieties could be developed in 50 years. In the same way beans, different breeds of poultry, sheep, swine, wheat, and corn arose.—Not all domesticated plants and animals have such complicated ancestry. The pea, soy-bean, and horse may be named as examples of those having a comparatively simple line of descent.—It is not without significance that the plants and animals in both hemispheres which best serve the needs of man originated at or near the junction of the great continents.—*L. Pace*.

1376. JUST, GÜNTHER. Der Nachweis von Mendel-Zahlen bei Formen mit niedriger Nachkommenzahl. Eine empirische Prüfung der Geschwister- und Probanden-Methode Weinbergs auf Grund von Kreuzungsversuchen mit *Drosophila ampelophila* Löw. [The determination of Mendelian ratios in forms with low number of offspring. An empirical test of Weinberg's method of sibs and method of samples on the basis of crossing experiments with

Drosophila ampelophila.] Arch. Mikros. Anat. 94: 604-652. 1920.—Weinberg's "method of sibs" is designed to determine the true proportion of recessives in families of a given type, when only those families can be taken into consideration in which at least 1 recessive individual appears, as is usually the case in work with human statistics. The method requires first an enumeration of the total number of sibs possessed by all the recessive individuals—the number of sibs possessed by each recessive individual of each family being counted, and these numbers added together. In this total number of sibs the number of the recessive sibs is then counted, and the proportion of the recessives to the total sibs, thus obtained, has been shown mathematically to correspond (within certain probability limits) to the (average) proportion of recessives that actually existed among all the families of this type (including even the uncounted ones in which no recessive appeared)—provided the recessives in the original material had a purely random distribution among the different families. To demonstrate experimentally the applicability of this method Just takes 2342 young F_1 *Drosophila* pupae from 7 F_1 crosses of red-eyed males by females heterozygous for red and white eye, and divides them into random lots containing 1-8 (sometimes slightly more) pupae each, in imitation of human families. He finds the proportion of recessive imagoes determined by this "method of sibs" to agree within the limits of probability with the true proportion existing in his total material—thus proving that the lots of pupae were really random lots. In some of the 7 experiments, however, there were significant deviations from the $\frac{1}{2}$ ratio, in either the calculated or the actual ratio, or both,—evidently referable to a lower viability of white-eyed flies, although Just supposes also that chance deviations in the total ratios in the original material may sometimes be cumulated with chance deviations in the distribution of recessives among the families so as to produce calculated ratios significantly different from the "expected." Just obtains similar results and draws similar conclusions after applying Weinberg's "method of samples," which differs from the "method of sibs" only in that, instead of utilizing all the recessives and enumerating their sibs, only a fraction of the recessives—chosen at random—are utilized, and their sibs enumerated.—H. J. Muller.

1377. KARPLUS, I. P. Familienforschung am Zentralnervensystem. [Familial studies on the central nervous system.] Neurol. Centralbl. 40: 109-112. 1921.—From an investigation of 56 groups of closely related human individuals cerebrum convolutions were found inheritable both in general pattern and in peculiar details. Proof is most conclusive when rare variations or a peculiar brain-type appear in different members of the same family. The inheritance of superficial structure is always by corresponding hemispheres; this correspondence is probably true also for finer peculiarities of organization responsible for functional differences.—In apes,—5 families studied,—hemispheres of the same brain are more nearly alike but there are fewer traces of transmitted characteristics. In cats and dogs, where hemispheres are also similar, there is more evidence of inheritability. In general, however, the more differentiated the hemispheres the greater the chance of inherited resemblances.—The author holds that sex cannot be determined by brain differences; there is equal variability and complication of structure in both sexes. But it is a secondary sex characteristic that the human foetal cerebrum of the male develops more rapidly than that of the female.—Evidence of transmission of peculiarities of brain stem and medullary substance was found to be greater in structures less varied and older, phylogenetically, than in the more varied and younger ones.—Helen K. Muil.

1378. KELLY, JAMES P. The synthesis of full-coloration in phlox. [Abstract.] Anat. Rec. 23: 89. 1922.—Earlier [see Bot. Absts. 7, Entry 1786] the writer reported in *Phlox Drummondii* certain F_1 purples that were full-colored and self-colored and gave an F_2 group of several blade types,—full-colored selfs, lighter-colored selfs, stippled-dusky type, and white-bladed type. The F_2 results showed that the 2nd and 3rd types never gave rise to each other in progeny, while the 1st might throw out the 2nd and 3rd types besides repeating itself. Such analysis led to the inference that full color was due to the presence together of the 2nd and 3rd types, or, rather, of the genes for these types. In the present communication the

writer reports the synthesis of full-colored selfs by the putting together in hybridization of the 2nd and 3rd types mentioned above.—*James P. Kelly.*

1379. KHADILKAR, T. R. A sectorial chimera in maize. *Jour. Heredity* 12: 284-285. 1 pl. 1921.—In the progeny of a 1st generation hybrid a single plant appeared with yellow and white stripes on the blades, sheaths, and stalk. Since the stripes were confined to one vertical half of a plant it is considered to be a sectorial chimera.—*J. H. Kempton.*

1380. KNEP, HANS. Über morphologische und physiologische Geschlechtsdifferenzierung. (Untersuchungen an Basidiomyzeten.) [On morphological and physiological sex determination. (Studies on Basidiomycetes.)] *Verh. Physikal. Med. Ges. Würzburg.* 18 p. 1919.—A general discussion of sex differentiation is given in connection with a presentation of the author's investigations on the smuts and Hymenomycetes. *Ustilago violacea*, as reported in detail in a previous publication, is found to be heterothallic. Differentiation of sex occurs in the reduction division at the germination of smut spores. The sporidia produced on the promycelia though morphologically similar are physiologically dimorphic, being equally divided between the 2 sexes, and may give rise by means of vegetative multiplication to unisexual races which are capable of taking part in conjugation only when the opposite sexes are grown in contact. In the case of the Hymenomycete *Schizophyllum commune* the findings are less consistent. Reduction division takes place at the formation of basidiospores, which give rise to haploid mycelia with uninucleate cells devoid of clamp connections. When haploid mycelia of opposite sex are grown together, anastomoses between them occur, and the binucleate condition of cells is established, characterized by the production of clamp connections which are considered a convenient criterion of the sexual process. Diploid fruiting bodies normally are produced from such sexually formed mycelia and give rise to basidiospores, which are not all of the same sex. Of 14 haploid mycelia studied, however, 3 produced fruits in pure cultures without production of binucleate cells or of clamp connections. Reduction failed to take place at the formation of their basidiospores, which in 1 case were shown to be all of the same sex as the race from which they had arisen. Of these 14 mycelia, 2 (Nos. 9 and 11) ultimately became binucleate and possessed of clamp connections. Offspring from 1 of these showed that sex differences had arisen. Of the 12 races which failed to show clamp connections 1 gave no sexual reactions when grown in pairs with the other 11 races, and the remaining 11 showed relatively few sexual reactions, which could be arranged in 2 unconnected sexual groups. Thus in the 1st group, No. 1 reacted sexually only with Nos. 3, 6, and 8, while Nos. 5 and 10 reacted sexually only with No. 3; and in the 2nd group No. 12 reacted only with Nos. 7, 13, and 14, while No. 2 reacted only with No. 7. From these sexual reactions, which are the only ones which could be produced, it is concluded that in the single-spore cultures tested there must be assumed to be 11 distinct types of mycelia represented. A Mendelian interpretation seems impossible. Spores obtained from the sexual reaction between mycelia Nos. 1 and 6 produced mycelia some of which reacted only with No. 1, some only with No. 6, and some with neither. A 2nd series of 10 single-spore cultures obtained from fruits in Germany were grown in individual contrasts with 11 of the 14 races previously discussed which had been derived from Holland, and in every contrast sexual reactions were obtained. It is concluded that all the cultures of the 2nd series contained factors lacking in the 1st. Twenty-one species of Hymenomycetes have been determined by the author to be heterothallic, and indications have been obtained that 3 are homothallic.—*A. F. Blakeslee.*

1381. KORNHAUSER, S. I. Further studies in the cytology of *Anisotrichis maritima* Bon. [Abstract.] *Anat. Rec.* 23: 102. 1922.—It was previously determined that the diploid chromosome number is 25 in the male and 26 in the female. Eleven tetrads and 1 hexad appear in the primary spermatocyte metaphase plates, whereas in the 2nd spermatocytes half show 12 and half 13 dyads. A detailed study of the hexad was made. It was found to be an XXY complex made up of 3 distinct spermatogonial chromosomes. Unlike the 22 autosomes, these remain compact during the leptotene. The 2 X chromosomes soon come to lie side by side and while the autosomes are conjugating the Y chromosome approaches and is in contact

with the 2 X elements by a narrow strand. Parasyndesis of the autosomes being completed the Y element now separates and remains apart from the XX element during the zygonema and pachynema. The X element stains like chromatin, but the Y element is lighter in chromatin stains, is vacuolated, and after Benda fixation takes mitochondrial stains.—With the onset of the synapsis the XX and Y elements fuse, and soon give off a sphaerule which stains like mitochondria and which gradually diminishes in size and disappears before the 1st meiotic spindle is formed. The XXY hexad comes out of the fused mass. From now on the Y element reacts to stains exactly like chromatin. In the 1st meiotic division 11 autosomal dyads and the XX element pass to one pole, whereas 11 autosomal dyads and the Y element pass to the opposite pole. During the interkinesis the 2 components of the XX element separate so that $\frac{1}{2}$ the 2nd meiotic division plates show 13 dyads.—*S. J. Kornhauser.*

1382. LANKESTER, E. RAY. Heredity and acquired characters. *Nature* 106: 500-501. 1920.—In this answer to an article by Sir Archdall Reid [*Nature* 106: 405-406. 1920] the author points out the exact meaning to be ascribed to the term "acquired characters" in discussing the inheritance of such. The limitations to be given to the term are quoted verbatim from Lamarck.—*L. R. Waldron.*

1383. LA RUE, CARL D. Variation and mutation in *Pestalozzia Guepini* Desm. [Abstract.] *Anat. Rec.* 23: 89. 1922.—The length of spores varies from generation to generation. A generation with long spores is followed by 2 or 3 with spores of reduced size, after which another long-spored generation appears. Fluctuations of a similar type have been found by other workers and have usually been attributed to environmental influences. In *Pestalozzia* the variations appear to be independent of fluctuations in environmental factors. They are likewise independent of the composition of the nutrient medium. One strain of *P. Guepini* gave rise to a mutation differing markedly from the parent strain both in spore characters and in vegetative development. From this mutation another originated with vegetative characters like those of the original strain but with spores identical in size and appearance with those of the first mutant. In another strain a mutation arose which differs from the parent strain in vegetative characters only.—*Carl D. La Rue.*

1384. LEHMANN, E. [German rev. of: (1) EAST, E. M. The phenomenon of self-sterility. *Amer. Nat.* 49: 76-87. 1915. (2) EAST, E. M., and J. B. PARK. Studies on self-sterility. I. The behavior of self-sterile plants. *Genetics* 2: 505-609. 1917 (see Bot. Absts. 1, Entry 1199). (3) Ibid. II. Pollen-tube growth. *Ibid.* 3: 353-366. 3 fig. 1918 (see Bot. Absts. 2, Entry 24). (4) EAST, E. M. Intercrosses between self-sterile plants. *Brooklyn Bot. Gard. Mem.* 1: 141-153. 1918 (see Bot. Absts. 1, Entry 876). (5) Ibid. Studies on self-sterility. III. Relation between self-fertile and self-sterile plants. *Genetics* 4: 341-345. 1919 (see Bot. Absts. 3, Entry 2120). (6) Ibid. IV. Selective fertilization. *Ibid.* 341-355. 1919 (see Bot. Absts. 3, Entry 2121). (7) Ibid. V. A family of self-sterile plants wholly cross-sterile inter se. *Ibid.* 356-363. 1919 (see Bot. Absts. 3, Entry 2122).] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 27: 147-152. 1921.

1385. LEIGHTY, CLYDE E., and SARKIS BOSHNAKIAN. Genetic behavior of the spelt form in crosses between *Triticum spelta* and *Triticum sativum*. *Jour. Agric. Res.* 22: 335-374. 1 pl., 3 fig. 1921.—Characters of the outer glume, spikelet, and rachis were studied. F_1 plants were spelt-like (intermediate). F_2 plants were classified into 10 arbitrary classes, class 1 representing true spelts, classes 2-9, inclusive, spelt-like forms, and class 10 true wheats. In F_2 , the spelt and spelt-like forms were to the true wheats as 3:1, but in 2 instances this relation was 15:1. These results were verified in F_3 .—In F_2 of wheat (Turkey and Seneca Chief) \times spelt-like form (Gatineau) no true spelts were produced, and the spelt-like forms were shifted toward the true wheat forms.—The authors conclude that "aside from the factor or factors for speling, there is positive evidence showing the presence of intensifying and diluting modifiers which tend to affect the degree of spelt characters without affecting to any extent the

ratios of spelts to wheats. Some of the diluting modifiers tend to act as inhibitors."—The possibility of producing wheats by crossing certain spelts is discussed. Evidence of the production of spelt forms by crossing certain wheats is presented.—*Ernest Dorsey.*

1386. LEVINSTEIN, OSWALD. Über hereditäre Anosmie. [On hereditary anosmia.] Arch. Laryngol. 32: 172-178. 1919.—The author reports the case of a boy, 18 years old, who entirely lost the sense of smell after a cold in the head. His father had become similarly afflicted after an attack of influenza 30 years previously and his adult sister had also lost the sense of smell. Due to the fact that anosmia, or the complete loss of the sense of smell, is extremely rare, the conclusion is reached that its occurrence in 3 individuals in a single family indicates the inheritance of a susceptibility of the olfactory region to infections which destroy its function.—*A. F. Blakeslee.*

1387. LÖHNER, L. Inzucht und biochemische Individualspezifität. [Inbreeding and biochemical individual specificity.] Riv. Biol. 3: 129-140. 2 fig. 1921.—Inbreeding has 2 effects: (1) It isolates certain recessive abnormalities, and (2) it causes a marked reduction in size, fertility, vigor, and resistance to unfavorable environment. The latter is the typical inbreeding phenomenon and should not be confused with the former. The effects of inbreeding cannot be explained by a mere isolation of pathologic factors. If this were true the regularity with which inbreeding produces certain symptom-complexes indicates a widespread occurrence of such factors. The author believes such an assumption not well founded. If deleterious factors were widespread they would often appear even when inbreeding did not occur. That inbreeding is injurious is indicated by the numerous arrangements in nature preventing self-fertilization. The author's hypothesis is that every organism has an individual biochemical specificity. When individuals of biochemical similarity are mated there is a deficiency in the progeny of certain biochemical stimulants, (hormones, enzymes, etc.). This accounts for the typical effects of inbreeding. No experiments have been conducted to substantiate the theory.—*D. F. Jones.*

1388. LOTSY, J. P. Over Gallus Temminckii G. R. Gray en over de eikleur der wilde Hoenderlinneonten. [Gallus temminckii and the egg color of the wild Linnean species of fowl.] Genetica 2: 400-404. 1 fig. 1920—Observations of eggs of *Gallus bankiva* have not brought to light a single white egg. They are uniformly some shade of brown. This in connection with the fact that Houwink secured fertile hybrids from a *Gallus bankiva* X *G. sonneratii* cross leads the writer to conclude that both races were concerned in the origin of domestic fowls.—*William A. Lippincott.*

1389. LOTSY, J. P. Volkstoename en voedseltoename. [Increase of population and the increase of food.] [Rev. of: PEARL, R., and F. C. KELLY. Forecasting the growth of nations. Harper's Mag. May, 1921.] Genetica 3: 481-484. 1921.

1390. LUNWIG, C. A. A curious variation in the common milkweed. Proc. Indiana Acad. Sci. 1920: 243-245. Fig. 1-6. 1921.—In 1917 a specimen of *Asclepias syriaca* L. was found that had a peculiar irregularity of most of the leaf margins and narrowing of leaves, some consisting of little more than a midrib; this plant was transplanted in 1917. Two other plants with the same peculiar leaf characteristic were found in 1918 and transplanted. In 1918 the 1st plant had almost normal leaves, but since then all 3 have had abnormal leaves. Seedlings from these plants have normal leaves.—*F. C. Anderson.*

1391. LUNDBORG, HERMAN. Hybrid types of the human race. Racial mixture as a cause of conspicuous morphological changes of facial type. Jour. Heredity 12: 274-280. 4 fig. 1921.—Observations regarding racial crossings between members of various royal families of Europe, and racial mixtures among Lapps, Finns, and Swedes of northern Sweden, with reports of similar crosses among primitive Malayan peoples show that a narrow, elongated face and increased bodily length results, "if not always in the first generation, then in subsequent ones." The author suggests further study of these phases as a significant task for race-biological research.—*Oliver Olson.*

1392. McCANDLISH, A. C. The value of the pure-bred sire in increasing the production of a scrub herd. *Jour. Dairy Sci.* 4: 12-23. 5 pl. 1921.—Scrub cows were mated to pure-bred dairy bulls of Holstein, Guernsey, and Jersey breeds. Milk and butterfat records of the 1st and 2nd generation grades and dams are given. The quality of the bulls was determined by comparing the records of daughters with those of their dams. In 1 case a decrease of 31 per cent in milk and 23 in fat in the daughter over the dam resulted from using a pure-bred bull. In a few other cases the quality of daughters remained practically unchanged. All 1st-generation grades taken together showed an increase of 39 per cent in milk and 37 in fat production when compared with their dams. In the 2nd-generation grades the average increase over grand-dams was 115 per cent in milk and 106 in fat. It is pointed out that the breeding of an animal is not a safe criterion of its quality and must be judged on its own merits.—*E. Roberts*.

1393. MACDOSELL, E. CARLETON. The action of alcohol upon germinal material. [Abstract.] *Anat. Rec.* 23: 92. 1922.—Four groups of white rats are considered: (1) Those treated; (2) their untreated children; (3) their treated children; (4) their untreated children's untreated children. Judged by behavior in a circular maze and by the size of their litters, all 4 groups show a small amount of inferiority in comparison with their respective controls. This result appears to support the interpretation that the alcohol has directly modified the germinal material.—If the numbers of litters produced in the same periods by the tests and their respective controls are compared, it appears that the treated rats produced only 32 of the expected 91 litters, or 35 per cent of the controls' production. The treated offspring of these treated rats produced 65 per cent of the expected number; the untreated offspring of the treated rats produced 33 per cent more litters than expected and the untreated grandchildren produced 55 per cent more litters than expected. The treated rats grew more slowly than their controls; their treated children about equaled their controls in growth and weight; their untreated children were heavier than their controls and their untreated grandchildren showed a less positive tendency to surpass their controls. The results from weight and the number of litters appear to show that the alcohol has acted as a selective agent upon a series of genetic differences present in the original animals.—*E. Carleton MacDowell*.

1394. MALTE, M. O. Variation and inheritance in red clover. *Sci. Agric.* 2: 79-83, 125-132, 157-162. 1921.—Red clover is self-sterile. Morphologically, European red clover has appressed hairy stalks and American red clover spreadingly hairy stalks. Biologically early types give 2 full hay crops per season and late types only 1. Presence of leaf markings is dominant over absence, and central markings over basal. Polyphylly is hereditary. White-blossomed forms are fairly common, blue-flowered forms are rare, and red-flowered forms are dominant. Seed clover is hereditary, dark-purplish being dominant over light-purplish, and both over yellow. No correlation exists between color and weight of seed, nor between color of seed and agricultural value of the plant. Light- or dark-colored seed may produce either poor or valuable plants. The inherent value of red clover seed depends largely on its pedigree.—*B. T. Dickson*.

1395. MARSHALL, F. R. Results of experiments with cross-bred range sheep. *Nation. Wool Grower* 10: 17-19. 1920.—These experiments were designed to develop a system of breeding to maintain the desirable qualities both as to fleece and mutton of the F_1 cross of long (coarse)-wool rams with fine-wool ewes. Such F_1 individuals are very desirable as stock ewes over the main part of the range sheep country of the northern [U. S. A.] states. The advantages of the cross-bred type over the pure fine-wool type of ewe are: (1) Fewer sterile individuals, (2) higher percentage of twins, (3) heavier lambs, (4) younger-fattening lambs, and (5) heavier fleeces with less shrink in washing. The disadvantages of the cross-bred type of ewe are: (1) A less pronounced flocking instinct, (2) a difficulty in holding to the F_1 type since the majority are not true F_1 's, and (3) a grade of wool less in demand. The cross-bred types are represented by the Corriedales, which originated in Australia in a cross between Lincoln and Merino stocks; the Columbias and Panamas of American origin based on a similar

type of mating with Cotswold blood supplementing the Lincoln; and any other types produced with approximately equal inheritance of the blood of long wools and fine wools.—*Edward N. Wentworth.*

1396. MATHEWS, J. W. Sheep and wool for farmers. Cross-breeding experiments. The wool and mutton type. *Agric. Gaz. New South Wales* 29: 480-490. 8 fig. 30: 99-110, 160-175, 406-421, 837-847. 4 pt., 4 fig. 1919.—These papers summarize a series of sheep breeding experiments involving 348 individuals and 7 years work. Early investigations indicated that for market purposes the long-wooled breeds, Lincoln, English Leicester, and Border Leicester, gave better results in crossing to fine-wooled Merinos than did the middle-wooled breeds,—Southdown, Shropshire, and Dorset Horn. Rather extensive tables of value from an agricultural standpoint are presented. Genetically there are some suggestive facts discovered. (1) Fertility was greater in mating Australian ewes to British-bred rams than in the reciprocal mating. (2) Fertility was greatest in autumn lambing, the ewes being bred in November and December. (3) Merino ewes will mate at practically any period of the year, but cross-breds usually mated only in January and February. (4) In Merinos, oestrus occurred on or about the 17th day and continued for 12 days with slight variations. (5) F_1 ewes from English Leicester rams averaged about 6 per cent more fecund than those by Border Leicester or Lincoln rams. (6) Most of the F_1 crosses presented a fairly uniform blend in conformation between the long-wool and fine-wool types. The Lincoln furnished the F_1 type most uniform and regular in bodily outline. (7) F_1 's from Border Leicesters averaged 15 pounds heavier at 1 year 5 months than F_1 's from Lincolns, and 19 pounds more than F_1 's from English Leicesters. (8) F_1 Lincoln wethers averaged 1 pound 6 ounces more fleece per head than Border Leicester F_1 's, and 1 pound 5 ounces more than English Leicesters. (9) Greater variability and coarseness were found in the fleeces of F_1 Lincolns than in the fleeces of the F_1 's from the other 2 breeds. (10) Higher yields per head of clean wool and higher market grades of wool were obtained in the F_1 Border Leicesters than in the F_1 's of the other 2 breeds.—*Edward N. Wentworth.*

1397. MAVOR, JAMES W. The elimination of the sex-chromosome by X-rays: A modification of the germ plasm produced by an external agent. [Abstract.] *Anat. Rec.* 23: 99. 1922.—Homozygous, wild-type, virgin female *Drosophila* were treated with X-rays and mated to white-eyed males. None of 19 control pairs produced any white-eyed flies, although they produced over 6500 offspring. Twelve out of 15 treated females produced white-eyed males.—*James W. Mavor.*

1398. MEEK, C. F. U. A further study of chromosome dimensions. *Proc. Roy. Soc. London R* 91: 157-166. 1920.—There is no correlation between the somatic complexity of an animal and the lengths, diameters, total volume, or number of the chromosomes composing its complex. The author previously reported that the diameter and total volume of the chromosomes were correlated with somatic complexity.—*R. L. King.*

1399. MEGGENDORFER, FRIEDRICH. Die Disposition zur Paralyse. [The disposition to paralysis (paresis).] *Med. Klinik* 1920: 305-309. 1920.—Paresis is a form of syphilis. Not all syphilitic persons, however, are afflicted with this disease. To explain this fact some investigators suggest that syphilis is caused by different species of spirochaetes, one of which tends to attack the nervous system. This theory is not supported by evidence from clinical observation. On the other hand, several dermatologists claim that the disposition to paresis is hereditary and cite numerous cases to prove their statement. Other clinicians can find no trace of this. Stern believes that corpulent, muscular persons are inclined to paresis, the immediate cause of the disease being abnormalities of the ductless glands. This theory has not been definitely proved, but it is very probable. Meggendorfer maintains that the cause of paresis in syphilitic persons is the failure of the defense mechanism of the body. Paresis generally occurs in light cases of syphilis where the organism does not show any marked reaction to the spirochaetes. It also occurs most frequently in old persons. The factors which

cause the decline in the person's power to react against foreign organisms fall into 2 groups. The 1st group is composed of constitutional factors. These are hereditary and are present in families in which there have been many cases of syphilis. These factors in turn bring about glandular abnormalities. The 2nd group is made up of factors such as old age and alcoholism which hinder the formation of antibodies.—*B. Whiteside.*

1400. METZ, C. W. Incomplete synapsis of chromosomes and its possible relation to linkage variations. [Abstract.] Anat. Rec. 23: 95-96. 1922.—In flies of the genus *Dasyllis* certain chromosome pairs appear to undergo incomplete synapsis during spermatogenesis, with the result that certain parts of the chromosomes remain well separated throughout the spermatocyte growth period. The process is uniform and constant in these particular chromosomes, which can be identified by their size and shape. Such chromosome behavior recalls the genetic behavior of the low crossover strains of *Drosophila melanogaster* (Sturtevant, Detlefsen) in which crossing over is greatly reduced or eliminated in certain "regions" of particular chromosomes. One simple assumption that might account for this result is that of incomplete synapsis in the chromosomes involved. Unfortunately, *Drosophila* is not favorable for a cytological study of this question and *Dasyllis* is not suited for genetic analysis, so that the 2 lines of evidence cannot, as yet, be obtained in the same animal. However, the data from *Dasyllis* leave little doubt on one of the main points, namely, that synapsis is not necessarily uniform but that different parts of a chromosome may differ radically in this respect. This fact lends support also to the hypothesis that the grouping or clumping of genes in the chromosome maps of *Drosophila* may be due to differences in the intimacy of synapsis in the corresponding regions of the chromosomes.—*C. W. Metz.*

1401. MIDDLETON, A. R. Heritable effects of chemically differing media on the fission rate of *Paramecium caudatum*. [Abstract.] Anat. Rec. 23: 98. 1922.—For 130 days 2 sets of 20 lines each comprising the 2 halves of a single clone of *Paramecium caudatum* were kept, one set in $\frac{1}{2}$ per cent Horlick's Malted Milk prepared with $\frac{1}{2}$ per cent normal saline. After 10-, 20-, 30-, 40-, and 80-days' exposure to these chemically diverse environments the 2 sets were duplicated and kept for 10, 20, 60, 90, and 150 days, respectively, in $\frac{1}{2}$ per cent normal saline malted milk. During the 13 10-day periods of the main experiment the saline lines divided characteristically more rapidly than the distilled-water lines. This relatively faster rate of division of the saline set persisted during 10-days' cultivation in intermediate saline subsequent to 20 days in extremes, and during 50 days in intermediate saline subsequent to 30 days in extremes. An exposure of 40 days or longer to extremes produced the reverse effect when the duplicate sets were cultivated in intermediate saline. This result may be due to some undetectable injury from long-continued exposure to relatively high salinity.—*A. R. Middleton.*

1402. MORRIS, O. M. Report of the division of horticulture. Washington Agric. Exp. Sta. Bull. 158. 26-30. 1920.—Crosses between loganberry and dewberry were practically intersterile and crosses between the raspberry and loganberry proved intersterile. Studies of the inheritance of characters are being made in a cross between the blackcap raspberry and the red raspberry.—*H. K. Hayes.*

1403. NABOURS, ROBERT K. A linkage diagram of nine factors for color patterns in *Apotettix eurycephalus* Hancock. [Abstract.] Anat. Rec. 23: 96. 1922.—The recessive, gray normal (primitive, or wild, type) and 9 dominant color characters, all from nature, are as follows: $+/-$ = gray normal; M/M = V-pattern; Y/Y = white-spot; O/O = white-all-over; R/R = yellow-all-over; W/W = yellow-striped-femora, Z/Z = brown-tipped-femora; G/G = brown-stripe; K/K = white-stripe; T/T = red-all-over. During the 10 years of the experiment, breeding bisexual and parthenogenetically, these factors have been paired 200,942 times in the females, ranging from 15,142 pairings of R and K to 1,794 of O and W (crossing over occurs only to a negligible extent in males). M and Y are nearly, if not exactly, allelomorphs. O , R , W , and Z , forming a group of multiple allelomorphs, average 5.82 per cent of crossing over.

with *M*, and *Y*, *G*, *K*, and *T*, each allelomorphic to the other, average 0.63 per cent of crossing over with the *O*, *R*, *W*, *Z* group. The average direct crossing over between *M* and *Y* and the *G*, *K*, *T* group amounts to 6.12 per cent. The difference between this longer distance and the sum of the 2 shorter, amounting to 0.33 per cent, may partly be accounted for by double crossing over, which infrequently occurs. There are considerable divergences among several pairs in the crossing over percentages, and wide divergences among given pairs between the percentage of linkage, or coming together, and the percentage of separating, or crossing out.—*Robert K. Nabours.*

1404. NACHTSHEIM, HANS. Sind haploide Organismen (Metazoen) lebensfähig? [Are haploid organisms (Metazoa) capable of life?] Biol. Zentralbl. 41: 459-479. 1 fig. 1921.—Paula Hertwig treated eggs of *Rhabditis pellio* with radiated sperm and got defective embryos. The author showed that unfertilized eggs of *Dinophorus apatris* gave non-viable embryos. Explanation of non-viability is sought in the haploid condition disturbing the nucleo-cytoplasmic relation. The author discusses various ways in which the double number of chromosomes may be produced in parthenogenesis and gives instances of each type. P. Hertwig extends idea of non-viability of haploid organisms to natural partbenogenesis. The author criticizes this view on the basis of his own work on spermatogenesis of the boney-bee and Schrader's work with *Trialeurodes vaporariorum*. It is considered that the hymenopterous type of sex-determination originated from the type with heterogametic male. Possibility of producing drones from fertilized eggs and females from unfertilized eggs is considered from the point of view of non-disjunction. Goldschmidt's suggestions relative to Dickel's idea of sex-determination by nutrient are criticized. Whiting's "sex-linkoid" inheritance in *Hadrobracon* is regarded as experimental evidence in favor of haploid nature of parthenogenetically produced males. Jegen considers normal drones of honey-bee diploid and abnormal sterile drones from unfertilized worker eggs haploid. The author contends that abnormalities are due to crowding in worker cells during development. Jegen [see Bot. Absts. 11, Entry 1373] holds that in normal drones, a 2nd polar body or small spermatid passes into the receptaculum seminis of the female and effects fertilization determining a normal diploid male. The author thinks this improbable.—*P. W. Whiting.*

1405. NEWMAN, H. H. Hybrid vigor, hybrid weakness, and the chromosome mechanism of heredity. An experimental analysis of the physiology of heredity in the reciprocal crosses between two closely associated species of sea-urchins, *Strongylocentrotus purpuratus* and *S. franciscanus*. [Abstract.] Anat. Rec. 23: 99. 1922.—In Echinoderm hybrids, as in Teleost hybrids, the entire history of large groups of individuals can be followed from fertilization to a definitive larval condition. In the cross *Strongylocentrotus purpuratus* ♀ × *S. franciscanus* ♂ there is frequently very pronounced hybrid vigor associated with extreme hybridity in many positive larval characters; yet there is also equally prevalent hybrid weakness. In the reciprocal cross there is no hybrid vigor, but only hybrid weakness, and very little, if any, paternal heredity. These facts form the basis of certain theories of heredity; it is the author's belief that they are compatible with current theories of the chromosomal mechanism of heredity.—*H. H. Newman.*

1406. OOSTHUIZEN, J. DU P. The improvement of cotton by seed selection. Jour. Dept. Agric. Union of South Africa 2: 505-516. 7 fig. 1921.—The author discusses deterioration of cotton in South Africa caused by mixing of the numerous varieties introduced for trial, and outlines a plan to be followed by farmers in improving by selection the uniformity of their planting seed.—*T. H. Kearney.*

1407. OTTENBERG, REUBEN. Hereditary blood qualities. Medico-legal application of human blood grouping. Jour. Immunol. 6: 363-385. 15 charts. 1921.—The possibilities of application of the Mendelian nature of human blood groups to medico-legal questions are presented. Agglutination of red blood cells is produced by contact with blood serum derived from another individual of the same species. The agglutinogens which allow this process are

rarely present at birth but are usually established by the 1st, and always by the 2nd, year. The theory of the origin of the different types of agglutinogens is discussed. Charts are given showing that 80 per cent of all possible unions between the 4 blood groups have offspring of a definitely limited type and therefore may have medico-legal value. The author also gives charts in which the illegitimate nature of a child can be "proven." The conclusiveness of the test where applicable is established and the need of legislation to make tests compulsory in important cases is suggested.—*C. C. Little.*

1408. PAINTER, THEOPHILUS S. Studies in Reptilian spermatogenesis I. The spermatogenesis of lizards. *Jour. Exp. Zool.* 34: 281-327. 4 pl., 8 fig. 1921.—A study is reported of spermatogenesis of 7 species in 2 families of lizards with especial reference to the sex-chromosomes. The description of the chromosomes of the single species of 1 family is fragmentary. The following data refer to the 6 species of the other family. In the diploid complexes of the males there are 12 macro-chromosomes around the periphery of the spindle surrounding a number of micro-chromosomes, a different number for each species. The sex-chromosome in the 1st maturation division is in all cases bipartite, being composed of 2 spermatogonial macro-chromosomes. It passes undivided to one pole so that half of the secondary spermatocytes receive 5 macro-chromosomes plus 1 bipartite sex-chromosome, and the other half receive only 5 macro-chromosomes. The anaphase of the secondary spermatocytes shows that $\frac{1}{2}$ of the sperm receive 5 macro-chromosomes plus 1 bipartite sex-chromosome, and the other $\frac{1}{2}$ only 5 macro-chromosomes. The expectation that the female diploid complexes would contain 14 macro-chromosomes (10 plus 4 sex-chromosomes) was verified in 2 respects in 1 species; (1) Diploid ovarian complexes contained 14 macro-chromosomes; (2) the somatic cells of some embryos contain 12 and those of others 14 macro-chromosomes. The male then is heterozygous for the sex-chromosome, and the reduction division for this chromosome is the 1st division. The constancy of the 12 macro-chromosomes for each species supports McClung's 1905 and 1908 generalization that there is a definite relation between chromosomes and taxonomic position.—*C. L. Parmenter.*

1409. PAINTER, THEOPHILUS S. The spermatogenesis of man. [Abstract.] *Anat. Rec.* 23: 129. 1922.—A study has been made on the spermatogenesis of man using testicular material (from 2 negroes and 1 white man), which was perfectly fresh when preserved. The main results are as follows: There are 48 chromosomes in dividing spermatogonia in both white and negro testes. Two of these 48 chromosomes have no synaptic mates of the same size or shape. These are the X and Y sex chromosomes. Primary spermatocytes show 24 chromosomes. The X-Y sex chromosome consists of an element, the 2 halves of which are very unequal in size. When division occurs, the X chromosome goes to one pole, and the Y to the other.—*Theophilus S. Painter.*

1410. PAINTER, THEOPHILUS S. The spermatogenesis of the opossum. [Abstract.] *Anat. Rec.* 23: 129-130. 1922.—Spermatogenesis of the opossum has been worked out. The diploid, or somatic, chromosome number is 22 (previous investigators have reported 17 and 24). Two of these have no synaptic mates of the same size and shape. These are the X and Y sex chromosomes, which segregate to opposite poles during the 1st maturation division; hence half the sperm carry an X and half a Y sex-chromosome. A study of embryos confirmed the above conclusions.—*Theophilus S. Painter.*

1411. PATTERSON, J. T. Sex ratios in *Platygaster*. *Amer. Nat.* 55: 180-183. 1921.—The author presents further data on sex ratios in a species of polyembryonic Hymenoptera, *Platygaster felti*. Of 2,722 individuals in 200 broods, 86 per cent are females and 14 per cent males. No completely male brood has been found, and in no case does the number of males equal or exceed the number of females; 9 pure female broods were found. The author notes the frequent occurrence of broods with a single male.—The results, after calculation of standard deviation, show that the number of males produced does not vary as much as if males were formed at random. This shows a tendency to have production of males confined to particular

cells in the embryonic mass, so that only 1 or 2 males are usually formed in a brood. Since 1 egg is deposited at each oviposition, it is practically certain that the mixed brood is the product of a single egg. Appearance of males may be due to the abnormal behavior of the sex chromosomes. An abnormal division causing loss of an X-chromosome from one of the early blastomeres would explain the appearance of a mixed breed, such a cell becoming the progenitor of 1 or more males.—*E. E. Jones.*

1412. PEARL, RAYMOND. Biometric data on infant mortality in the United States birth registration area, 1915-1918. Amer. Jour. Hygiene 1: 419-439. 7 fig. 1921.—This paper presents the following facts: Infant mortality rates show a high degree of place variation in both rural and urban areas. The distribution of this place variation is unimodal for both urban and rural, white and colored populations. Infant mortality remained about the same for the years 1915-18. Differences in infant death rate between large and small cities are not significant. The mean death rates for rural areas are less than for urban areas. The mean rates of infant mortality are about twice as large for the colored population as for the white population in each demographic unit considered.—Cities over 25,000 in population are distinctly less variable in infant death rate than smaller cities or rural counties. The colored population is much more variable in respect to infant mortality than the white. The variation is skewed in the positive direction. Kurtosis is positive and large in amount. Types I, IV, and VI of Pearson's skew frequency curves graduate the data satisfactorily.—*John W. Cowen.*

1413. PEARSON, KARL. Was the skull of the Moriori artificially deformed? Biometrika 13:339-346. 1 pl. 1921.—The author replies to a criticism by Giuffrida-Ruggeri of Thomson's memoir [Biometrika 11: 82-135]. Scott, Poll, Flower, Turner, Duckworth, and others had described Moriori skulls without finding evidence of artificial deformation. Thomson's nasal indices agree with Scott's and Duckworth's.—*John Rice Miner.*

1414. P[OPENOE], P[AUL]. Mental hygiene. [Rev. of: ROSANOFF, AARON J. Manual of psychiatry. 6th ed., 684 p. John Wiley & Sons: New York, 1920.] Jour. Heredity 12: 300. 1921.

1415. P[OPENOE], P[AUL]. [Rev. of: SALEEBY, C. W. The eugenic prospect: National and racial. 239 p. Dodd, Mead & Co.: New York, 1921]. Jour. Heredity 12: 318. 1921.

1416. PRELL, HEINRICH. Die Grenzen der Mendelschen Vererbung. [Limits of Mendelian heredity.] Zeitschr. Indukt. Abstamm.- u. Vererb. 27: 65-75. 1921.—Mendelism in the narrower sense is discussed. To Mendelize, as defined by de Vries, means to follow Mendel's laws. The author analyzes Mendel's laws as follows: (1) The law of segregation of factors and (2) law of independent assortment of factors can remain as formulated by Mendel. (3) The law of uniformity of reciprocal crosses was first observed by Gärtnner and may be more properly called Gärtnner's law. (4) The law of dominance was not strongly emphasized by Mendel. DeVries was the first to do this and, therefore, this can be called deVries's law. This law, however, no longer holds. Furthermore, the last 2 laws deal more with phaenogenetics than with heredity. (5) The law of equiproportionality or equal distribution of different factors is added by the author. The 1st, 2nd, and 5th of Mendel's laws are accepted; consequently, to Mendelize means to follow the laws of segregation, of independence, and of equiproportionality. Further limitations are brought about by the results of work with *Drosophila*. This limits the law of independence to factors which are located in different chromosomes and reduces their number to the haploid number of chromosomes in a given organism.—*M. Demerec.*

1417. RACIONIERI, A. Sterility in Freesias. Gard. Chron. 70: 209. 1921.—A note is presented on the "sterility" of a giant strain of *Freesia* obtained from the cross *F. Leichtlinii* X *F. refracta alba*. Evidently highly sterile hybrids are obtained occasionally in crossing certain species.—*A. B. Stout.*

1418. REIN, G. ARCHDALE. The natural history of man. *Nature* 107: 808-810. 1921.—The author holds that man is a "typical wild animal," and is fully open to natural selection, which, because of historical records, can be followed with unique completeness. Man varies in resisting the same and different microbial diseases. Resistance varies directly in proportion to length and severity of past experience with the disease. Selection proceeds in unlike directions with unlike racial effects, as typified by results from measles and tuberculosis. The author holds that if the Lamarckian doctrine were true present physiological reaction against these diseases would be quite contrary to what is actually found. It is pointed out how resistance to disease has been a powerful factor affecting migrations of people and settlement of new lands.—Evolution against narcotics is similar. Every race is insusceptible to charm of alcohol in proportion to length and severity of its past experiences with it. Races previously drunken are now temperate; the same is true of opium.—*L. R. Waldron.*

1419. RINNLE, OSCAR. Identical twins in pigeons arise from ova of markedly aberrant size. *Proc. Soc. Exp. Biol. and Med.* 19: 12-14. 1921.—In 5 of 7 cases of twins the eggs were of aberrant size for the female in question; in 4 the twin-producing egg was abnormally large and in the 5th it was the smallest of the group. By the assumption that in the larger eggs there was a "low oxidizing level," while irregularities of reproduction in the smaller eggs may have produced a "retardation of development previous to gastrulation," both sorts may be brought within the general scope of Stockard's theory of the production of double monsters and twins. In the 3 cases in which the sexes of the twins were determined both were females. These came from the large eggs, and the author points out that this is in conformity with his earlier findings.—*L. J. Cole.*

1420. ROBERTSON, W. R. B. Inheritance of color in the domestic turkey. [Abstract.] *Anat. Rec.* 23: 93. 1922.—A black male was bred to a bronze female. The F₁ generation was black except for a few barred feathers among the coverts of the tail. Also a Narragansett male was bred to a Bourbon red female. The F₁'s were much like the Narragansett, but showed distinctly the influence of the red in increased amount of the red or auburn feathers. In F₂ there were 4 black males and 2 black females (all showing a very few barred-pattern feathers among the tail coverts), 2 rusty black males showing more traces of barring than in the black, 1 bronze male and 6 bronze females, and 4 bronze-red males and 2 bronze-red females. The classes theoretically should be black (Narragansett), black-red bronze (Narragansett), and bronze-red. All classes were represented. The small numbers may account for the absence of females in the black-red. The experiment shows that the Narragansett pattern is an additional allelomorph. The series is black, bronze, Narragansett, and Bourbon red. This order also indicates their relative dominance, black being most dominant, bronze next, etc. Bronze seems to be completely dominant to Narragansett.—*W. R. B. Robertson.*

1421. ROWAN, J., and J. A. WILSON. Hereditary cataract. *British Jour. Ophthalmol.* 5: 64. 1921.—A note with pedigree chart is presented of 21 cases of cataract in 4 generations. The disease came on "between the ages of 13 and 18 years" and "presented opaque radiating spokes like ordinary senile cataract."—*Howard J. Bunker.*

1422. S., E. J. [Rev. of: HAYES, HERBERT KENNELL, and RALPH JOHN GARBER. Breeding crop plants. 15 X 23 cm., 328 p., 66 fig. McGraw Hill Book Co., Inc.: New York. 1921 (see Bot. Absts. 10, Entry 1714).] *Sci. Prog.* 16: 488. 1922.

1423. SAX, KARL. Chromosome relationships in wheat. *Science* 54: 413-415. 1921.—Cytological studies showed the same chromosome numbers as reported by Sakamura. The haploid numbers are as follows: Einkorn, 7; *T. dicoccum*, *T. durum*, *T. turgidum*, and *T. polonicum*, 14; *T. vulgare* and *T. compactum*, 21.—Crosses between species which contain different chromosome numbers result in partial or total sterility in F₁. In the F₂ of a partially sterile species, cross sterility does not seem to be associated with any particular morphological group. The volume of the mature pollen grains measured in thousands of cubic microns of

the 7, 14, and 21 haploid chromosome groups was about 72, 94, and 114 respectively. Reasons are given for the belief that the species having 14 and 21 chromosomes are a result of reduplication of the 7 chromosomes of Einkorn or wild wheat.—*H. K. Hayes.*

1424. SHAMEL, A. D. The improvement of plants through bud selection. 28 p., 41 pl. Exp. Sta. Hawaiian Sugar Planters' Assoc.: Honolulu, Hawaii, 1921.—A review is made of investigations in bud mutations. Shamel states his belief that equally valuable results "may be expected in the way of plant improvement from bud selection as has been the case with seed selection."—*H. K. Hayes.*

1425. SHULL, GEORGE H. Three new mutations in *Oenothera Lamarckiana*. [Abstract.] Anat. Rec. 23: 91. 1922.—The origin and characteristics of the following new mutations are described: (1) *O. Lamarckiana* mut. *funifolia* has strongly revolute leaves and is regarded as a parallel mutation in relation to *O. pratincola* mut. *formosa* Bartlett. (2) *O. Lamarckiana* mut. *pervirens* differs from the parent in having stems and buds wholly devoid of red pigmentation. (3) *O. Lamarckiana* mut. *vetaurea* has flower color modified to a pale old gold, the only previous departure in flower color in the *Oenotheras* having been to a pale yellowish white known as *sulfurea*. All 3 mutations are recessive to the parental type and at least (1) and (3) originated as new gene-mutations. Mut. *pervirens* may possibly have been produced as the result of a crossover.—*George H. Shull.*

1426. SMITH, H. J. A biological insurgent. Sci. Amer. 124: 429. 1921.—The author attacks the theory of mutation. He believes that not only mutations, but many of the minor variations that are observed in plants and animals, are not original, but are "throwbacks" to types that have otherwise become extinct.—*Chas. H. Otis.*

1427. SMITH, L. Sea Island cotton in St. Croix. Virgin Islands Sta. Bull. 1. 14 p., 2 pl. 1921.—Selection has been carried on since 1911 to improve Sea Island cotton in St. Croix, in productiveness, in length and quality of fiber, and in resistance to blister mite (*Eriophyes gossypii*). Experiments are described in hybridizing Sea Island with Sakellaridis Egyptian and other types. The practicability is discussed of production of first-generation-hybrid seed for commercial planting.—*T. H. Kearney.*

1428. STODDARD, LOTHROP. The rising tide of color. 320 p., 3 maps. Charles Scribner's Sons: New York City, 1920.—The book opens with an "introduction" by Madison Grant which gives an historical and prehistorical résumé of the race conflicts of the past, especially in their impact upon the Nordic as the predominant white race. The main body of the work is divided into 3 parts. The first reviews the racial characteristics, aptitudes, interests, and instincts of the yellow, brown, black, and red races from the standpoint of their bearing upon the problems of world politics, and emphasizes the "supreme importance of race" over "mere political phenomena." The author notes the resurgence of the yellow and brown races together with a universal antagonism to white dominance, and observes an inherent racial subordination of black and red to either yellow or white. The second part discusses the forces operative in the rise and decline of the white supremacy in the last 400 years and emphasizes the disintegration and dysgenic depletion of the race through intermecine strife culminating in the Great War. The last part deals with the increasing pressure of the colored races upon the white world and the importance of maintaining the barriers against it. While the work deals very largely with the subject as a political, social, and economic problem, much stress is laid on the genetic racial factors involved and the necessity of preserving white racial purity in the interests of the progressive evolution of the best civilization.—*Howard J. Bunker.*

1429. SUMNER, FRANCIS B. Desert and lava-dwelling mice and the problem of protective coloration in mammals. Jour. Mammalogy 2: 75-86. 1 pl. 1921.—The author believes that protective coloration brought about by natural selection of random variations is insufficient to account for differentiation (in color) of allied species with different habitats. He cites the

case of desert animals, particularly rodents, which are generally buff or sandy-colored, noting, as presumptive evidence opposed to protective-coloration hypotheses, that most desert rodents are nocturnal and subterranean; that invisible as well as visible parts are pallid; that there is little need among them for concealing coloration; and that in some cases where increase or decrease in darkness has taken place the response of the organism to changed environment (e.g., increased humidity producing darker forms) is a more satisfactory explanation. In case of the greater darkness of rodents inhabiting black lava beds, as compared with those inhabiting deserts, he submits the protective-coloration hypothesis to test; 157 specimens of a mouse (*Peromyscus crinitus stephensi*) taken from a black lava bed to which this variety is restricted, and which is entirely surrounded by desert, were buff or sandy-colored and conspicuous against a black background. These mice were indistinguishable in color on gross and quantitative (photometer) examination from 113 specimens of *P. crinitus stephensi* taken from a typical desert locality 50 miles distant. The author concludes that the greater darkness of other black lava-inhabiting forms is probably not due to need for concealing coloration or to effect of black background but to accident or other factors.—*L. C. Dunn.*

1430. SVEDELius, N. Einige Bemerkungen über Generationswechsel und Reduktionsteilung. [Some remarks on alternation of generations and the reduction division.] Ber. Deutsch. Bot. Ges. 39: 178-187. 1921.—The time of the reduction divisions is important because more combinations are possible if reduction occurs at gametogenesis rather than at an early stage of development. The greater development of the sporophyte as compared with the gametophyte is considered to be due to the greater possibilities for chromosome combination, and therefore greater adaptability, in the $2x$ generation, rather than the adaptation of the sporophyte to land habits.—*Hally Jolivette Sax.*

1431. TALIAFERRO, W. H. Variation and inheritance in size in *Trypanosoma lewisi*. I. Life-cycle in the rat and a study of size and variation in "pure-line" infections. Proc. Nation. Acad. Sci. [U. S. A.] 7: 138-143. 2 fig. 1921.—This preliminary report furnishes data which will be used as a basis for further work. "Pure-line" infections were obtained by inoculating each rat with a single specimen of *Trypanosoma lewisi*. The incubation period in the rat lasts 1-7 days. Multiplication lasts for 10-25 days, after which no growth or multiplication occurs and only "adults" are present. Trypanosomes disappear from the blood in from 1 to many weeks. Both mean length and coefficient of variation become practically constant by the 19th day. [See also following entry.]—*R. W. Hegner.*

1432. TALIAFERRO, W. H. Variation and inheritance in size in *Trypanosoma lewisi*. II. The effects of growing "pure lines" in different vertebrate and invertebrate hosts and a study of size and variation in infections occurring in nature. Proc. Nation. Acad. Sci. [U. S. A.] 7: 163-168. 1921.—On the basis obtained in the first paper [see preceding entry] in this series and with the coefficient of variation as an indicator, the following conclusions are reached: (1) A "pure line" undergoes no significant changes in the coefficient of variation when passed from rat to rat of the same species or of different species; (2) when passed through the flea the coefficient of variation of a "pure line" increases, which indicates that the "pure line" breaks up into heritably diverse lines; (3) "wild" infections differ considerably in their coefficient of variation and probably consist of 1 or many different "pure lines."—*R. W. Hegner.*

1433. TAMMES, T. Die Flachsblüte. [The flower of flax.] Recueil Trav. Bot. Néerland. 15: 185-227. 22 fig. 1918.—A careful description is given of the flax flower together with the rate of development of the flower and the effect of different environmental conditions. It is pointed out that flax has been generally considered to be self-fertilized, and some writers have believed that natural cross-fertilization never takes place. The author grew varieties which were capable of being crossed near each other for several years. Insects were observed to go from the flowers of one variety to those of other varieties. Several natural crosses appeared in the cultures although the number was very small.—*H. K. Hayes.*

1424. TILDESLEY, M. L. A first study of the Burmese skull. *Biometrika* 13: 170-262. 9 pl., 18 fig. 1921.—Direct measurements and cranial contours were made of 142 skulls. Difficulties of definition of basion, auricular, point, and inion are discussed. Methods of measuring and drawing contours are described. Means of measurements from individual contours or measurements from type contours may replace direct measurements. However, slight defects in the instrument may be magnified in contours. Skulls were divided into 2 series, more massive (Burmese), intermediate (hybrid?), and less massive (Karen?). The correlation is -0.3 ± 0.1 between palate index and capacity of skull. Coefficient of racial likeness is proposed. The Burman race is more closely allied to Malayan than to Chinese; Karens (?) *vice versa*. Hybrids are closer to both Malayan and Chinese than pure Burmans or Karens (?) are to either. Correlation between greater occipital development on one side and greater frontal development on the other is $+0.62 \pm 0.07$. No certain association is found between Sylvian asymmetry and asymmetry of frontal and occipital bones, nor between outer occipital asymmetry and direction of main occipital sinus when its course changes from longitudinal to lateral. Contingency between position of greater groove and greater jugular foramen is 0.70.—*John Rice Miner.*

1425. TISNALE, H. B. Report of associate plant breeder. *Alabama Agric. Exp. Sta. Circ.* 44. 16-17. 1921.—Progress is reported in breeding and testing wilt-resistant varieties of cotton in Alabama, and reference is made to experiments in hybridizing resistant strains with non-resistant varieties superior in yield or length of fiber.—*T. H. Kearney.*

1426. TOMHAVE, W. H., and C. W. McDONALD. Cross-breeding Delaine Merino ewes with pure-bred mutton rams. *Pennsylvania Agric. Exp. Sta. Bull.* 163. 19 p., 8 fig. 1920.—A four years' investigation on crossing Delaine Merino ewes with pure-bred Shropshire and Southdown rams is reported. Cross-bred lambs made a more rapid growth and fattened more easily than Grade Delaine Merino lambs. The quality of wool and mutton conformation were higher in cross-breds. On the basis of 100 per cent of lambs for Delaine Merino ewes, the cross-breds produced 125 to 150 per cent. This means that twinning in cross-breds was greater than in Delaine Merinos.—*E. Roberts.*

1427. TRAQUAIR, H. M. Hereditary glioma of the retina. *British Jour. Ophthalmol.* 3: 21-22. 1919.—A clinical report with comments is made on a case of hereditary glioma in father and 2 children; this report was made on the suggestion of Hill Griffith, who reported 2 families in the *Transactions of the Ophthalmological Society of the United Kingdom*, 1917.—*Howard J. Bunker.*

1428. TSCHERMAK, ERICH VON. Über Züchtung landwirtschaftlich und gärtnerisch wichtiger Hülsenfrüchte. [Breeding of agriculturally and horticulturally important legumes.] *Arbeit. Deutsch. Landw. Ges.* 1919: 80-106. 1919.—Methods of breeding lentils, broad beans, Lima beans, lupines, soy-beans, vetches, and peas are discussed. The author recommends both selection and crossing to obtain increased yield of seed and forage.—Special qualities that should be given consideration by breeders are large seed types (lentils), higher grain yield, uniform maturity, alkaloid content (lupines), earlier maturity, resistance to plant lice (broad beans), resistance to disease and pea-weevil (peas), resistance to spot disease and red spider (Lima bean).—For peas and Lima beans lists of allelomorphic pairs of characters and of correlated characters are given.—In Lima bean crosses xenia was observed in size and shape of seed. Influence of male parent was found to extend also to form of pod.—*C. M. Woodworth.*

1429. USHER, C. H. A pedigree of microphthalmia with myopia and corectopia. *British Jour. Ophthalmol.* 5: 289-299. 1921.—A detailed description with pedigree chart is presented of 4 generations including at least 11 cases. The discussion is chiefly clinical. There is a bibliography of 50 citations, of which 39 "show inheritance of microphthalmia."—*Howard J. Bunker.*

1440. USHER, C. H. Histological examination of an adult human albino's eyeball, with a note on mesoblastic pigmentation in foetal eyes. *Biometrika* 13: 46-56. 2 pl. 1920.—Histological examination of a complete series of sections showed much pigment throughout the eye. The 2 epithelial layers at the back of the iris were found pigmented, but not so deeply as in normal eyes. The epithelial layer of the ciliary body was similarly lightly pigmented. The stroma of iris and ciliary body were free from pigment, as was the choroid, except at the macular region where there were a few pigment cells. The hexagonal cells of the retina were considerably less pigmented than those of a normal eye; they were darker at the macula. In no section was a fovea visible.—Total absence of pigment can not be used as a definition of human albinism. The absence of imperfect development of the fovea shown to occur in albinoic eyes may possibly be the chief cause of defective vision in these cases.—An examination of the eyes of 12 dark-race individuals, adult, infant, and foetal, indicated that in the dark-race eye mesoblastic pigment appears earlier in foetal life, especially in the choroid, and is in much larger quantity at the time of birth than in the European eye. Clinical examination of dark-race albinos indicates that they possess more ocular pigment than albinos of white races. Such facts might be interpreted to lend support to the Meckel-Mansfeld theory of albinism as "an arrest of development," but the writer believes other explanations might equally well be invoked.—*William R. Amberson.*

1441. WACHTER, W. L. Data concerning linkage in mice. *Amer. Nat.* 55: 412-420. 1921.—After enumerating the few known cases of linkage in mammals, the author discusses the evidence for the localization of genes in house mice. It is shown that 7 of the 20 or more chromosomes in the house mouse have been identified with visible characters. He presents new data which when added to those previously reported indicate that the following genes are not linked but segregate independently: (1) *A* (agouti) and *S* (self) in 1215 cases; (2) *A* (agouti) and *W* (black-eyed-white spotting) in 1124 cases; (3) *P* (dark-eye) and *W* (black-eyed-white spotting) in 641 cases.—*L. C. Dunn.*

1442. WAKABAYASHI, S. A study of hybrid oats *Avena sterilis* \times *Avena orientalis*. *Jour. Amer. Soc. Agron.* 13: 259-266. 1921.—The *F₁*, *F₂*, and *F₃* generations of Red Rustproof (*Avena sterilis*) \times Black Tartarian oats (*A. orientalis*) were studied as to the resistance to smut, sterility, color of the floral glume, shape of the panicle, dwarfness of culm, and correlations among these characters. Resistance to smut is completely dominant and is caused by multiple factors. Sterility due to a wide cross is comparatively high in the *F₁*, but decreases in succeeding generations. The black color of the floral glume of Black Tartarian is a simple Mendelian dominant character. The shape of the panicle is probably the result of multiple factors, if Mendelian. The production of dwarf plants was interfered with by sterility and it is difficult to state whether it is a simple Mendelian character. There seems to be some correlation between dwarfness and sterility and between smut susceptibility and white color of the floral glume and between susceptibility and the side character of the panicle. Sterility is not correlated with the color of the floral glume or the shape of the panicle.—*F. M. Schertz.*

1443. WALDRON, L. R. Rate of culm formation in *Bromus inermis*. *Jour. Agric. Res.* 21: 803-816. 2 fig. 1921.—The rate of increase of culm formation is not fixed but takes place at an accelerating rate. An equation was developed which expresses the rate of increase in a symbolical manner. The resulting curve is of the parabolic type. Plants initiating at culmage 1, 2, 3, and 4 become increasingly more divergent in number of culms later in the season.—*H. K. Hayes.*

1444. WALKER, J. C. Fusarium-resistant cabbage. [Rev. of: (1) JONES, L. R., J. C. WALKER, and W. B. TISDALE. Fusarium resistant cabbage. *Wisconsin Agric. Exp. Sta. Res. Bull.* 48. 34 p., 10 fig. 1920 (see Bot. Absts. 10, Entry 99). (2) JONES, L. R., and J. C. GILMAN. The control of cabbage yellows through disease resistance. *Wisconsin Agric. Exp. Sta. Res. Bull.* 38. 70 p., 22 fig. 1915.] *Bot. Gaz.* 73: 155-157. 1922.

1445. WALTON, A. C. The spermatogenesis of *Ascaris felis* Goeze. *Jour. Exp. Zool.* 34: 189-201. 2 pl. 1921.—*Ascaris felis* shows 9 haploid chromosomes plus an unpaired idiosome which attaches to 1 of the tetrads in the primary spermatocytes, rendering it hexad. The 1st maturation division is qualitative as regards this element, the idiosome passing undivided to 1 pole.—A. S. Romer.

1446. WHITING, P. W. Genetic mosaics and ontogenetic abnormalities in the parasitic wasp, *Hadrobracon*. [Abstract.] *Anat. Rec.* 23: 94-95. 1922.—The genetic differences are orange eye-color, completely recessive to black, and defective venation, irregularly recessive to normal. Normal inheritance is sex-linkoid. The sexes are readily distinguished by antennae, abdominal sclerites, and external genitalia. Patroclinous and mosaic males have all the external characters and usually gross internal anatomy normal for the male. They are regularly produced in variable percentage from the cross and from the black male by orange females. Much more rarely they arise from black female by orange male, but these have thus far been patroclinous for wing character only. They are usually sterile, but if fertile transmit either paternal or maternal characters. In one case both were transmitted and the male bred like a zygote. A single sterile male with orange eyes and black ocelli arose from a heterozygous female crossed to a black male. Only 2 gynandromorphs have been found. One was female except for one-half of the abdomen, which was clearly male. The other had the anterior half male, the posterior female. Mosaic males may be due to failure of nuclear fusion at fertilization. Gynandromorphs arise from a mixture of haploid and diploid tissue. The male which bred like a zygote may be tentatively explained as a sort of gynandromorph. Certain variations affecting external genitalia produce what were at first thought to be "intersexes." These have now been shown to be accidents of growth not correlated with sex.—P. W. Whiting.

1447. WODEDALEK, J. E. Studies on the cells of sheep with special reference to spermatogenesis, oogenesis, and sex-determination. [Abstract.] *Anat. Rec.* 23: 103. 1922.—In spermatogonia 33 chromosomes occur, 1, the sex-chromosome, is distinctly larger than the others. In the primary spermatocyte division 17 chromosomes appear, of which 16 are bivalent; the other is the unpaired sex-chromosome. This division gives rise to 2 types of secondary spermatocytes since the sex-chromosome passes to one pole undivided. Finally 2 types of spermatids are produced; all contain the 16 autosomes but only 1 possesses the additional sex-chromosome. In oogonia 34 chromosomes occur; 2 of these are the sex-chromosomes. In the primary oocyte division 17 bivalent chromosomes appear; 1 of these, clearly the largest, is the bivalent sex-chromosome. The reduced number of chromosomes in the female is 16 autosomes and 1 sex-chromosome, the same number being thrown off with the 1st polar body. This takes place in the ovary while the oocyte lies in the Graafian follicle. Various stages of this process have been observed in a number of cases. The prevailing number of chromosomes in the somatic cells of male and female embryos and foetuses corresponds to the number present in the spermatogonia and oogonia respectively.—J. E. Wodesdalek.

1448. WOODRUFF, LORANDE LOSS. Micronucleate and micronucleate races of infusoria. *Jour. Exp. Zool.* 34: 329-337. 1921.—Micronucleate races of *Oxytricha fallax*, *Urostyla grandis*, and *Paramecium caudatum* have been found and studied by the author. Dawson, Landis, and Patten have also discovered micronucleate races in *Oxytricha hymenostoma*, *Paramecium caudatum*, and *Didinium nasutum*, respectively. A discussion is given of the function of the micronucleus and macronucleus and of the possible method of origin of micronucleate races.—W. H. Taliaferro.

1449. WOODRUFF, LORANDE LOSS, and HOPE SPENCER. Some effects of conjugation in the life-history of *Spathidium spathula*. [Abstract.] *Anat. Rec.* 23: 113. 1922.—A study has been made of about 60 lines of exconjugants, all derived from a pedigree culture of *Spathidium* and bred under identical cultural conditions. A comparison of the division-rate and longevity of the parent lines and their exconjugant lines gave the following chief results: (1) A large majority of the exconjugant lines exhibited a higher division rate than their parent lines;

(2) a large majority of the exconjugant lines continued to live after the death of the parent lines; (3) from the original parent cell to the F_6 generation there have been nearly 1000 cell divisions, punctuated at the 30th, 134th, 425th, 573rd, 644th, and 904th divisions by fertilization. The survival value of conjugation is indicated by the fact that the parent, F_1 , F_2 , F_3 , F_4 , and F_5 generations have died in turn—the pedigree culture now existing is the F_6 generation.

—*Lorande Loss Woodruff and Hope Spencer.*

1450. WOODRUFF, LORANDE LOSS, and HOPE SPENCER. The early effects of conjugation on the division rate of *Spathidium spathula*. Proc. Soc. Exp. Biol. and Med. 18: 240-241. 1921.—Exconjugant lines of *Spathidium spathula* exhibit a higher division for the first 15 days after conjugation than the parent lines in which conjugation did not take place. Exconjugant lines derived from old parent lines (lines in which conjugation has not occurred for a long time) show a greater increase in the division rate for the first 15 days after conjugation than exconjugants derived from younger parent lines (lines in which conjugation has more recently occurred).—*W. H. Taliaferro.*

1451. WRIGHT, SEWALL, and PAUL A. LEWIS. Heredity of resistance to tuberculosis in guinea-pigs. [Abstract.] Anat. Rec. 23: 93-94. 1922.—The resistance to tuberculosis has been tested in over 1,100 guinea-pigs belonging to 5 closely inbred families, the crosses between these families, and a random-bred control stock. It has been found that sex, and even 3-fold differences in age, rate of gain, and weight have only a slight effect on length of life after inoculation. In striking contrast to these negative results are the great differences in fertility, weight, and vitality. The progeny of crosses are in general at least equal to the better of the 2 parental families. Resistance is thus dominant over susceptibility. There is equal transmission by sire and dam and to sons and daughters. In particular crosses, the average of the progeny is consistently superior to either parental line, indicating that the latter are susceptible for different reasons, each being able to supply a dominant resistance factor lacking in the other. In the whole cross-bred stock, over 30 per cent of the observed variation is determined by the amount of blood of the best inbred family, as compared with less than 10 per cent due to age, weight, and rate of gain combined, and leaving about 60 per cent due to conditions at or following inoculation.—*Sewall Wright and Paul A. Lewis.*

1452. YOCUM, HARRY B. The occurrence of telosynapsis in the male germ cells of *Leptocoris trivittatus*, Say. [Abstract.] Anat. Rec. 23: 103. 1922.—The chromosome complex of the spermatogonium consists of 13 chromosomes,—10 autosomes, 2 "M" chromosomes, and 1 accessory chromosome. After the last spermatogonial division all except the accessory enter into a fine spireme tightly tangled toward the center of the nucleus. As growth of the primary spermatocyte proceeds this thread becomes thicker and unwinds, filling the nucleus with a loosely convoluted thread. Near the end of the growth period this thread again contracts into a mass concentrated toward the center of the nucleus. There is no indication of any polarization or pairing of the thread during this period of synizesis. Later this spireme spreads out until it fills the nucleus with a lightly staining, very diffuse mass, the organization of which it was impossible to determine. The chromatin of this mass becomes condensed into a number of masses, probably 12, which, as they become compact, unite end to end to form the bivalent chromosomes of the primary spermatocyte. Conjugation of the homologous chromosomes is therefore by telosynapsis. The accessory chromosome can be distinguished at all times during the growth of the spermatocyte by its compactness and rounded contour. At the 1st spermatocyte division, which separates the homologous chromosomes, the accessory chromosome divides equally. At the 2nd maturation division the accessory passes to one pole undivided.—*Harry B. Yocom.*

1453. ZANDER, E. Der Einfluss der Bastardierung auf die Honigbildung. [The influence of hybridization on honey formation.] Zeitschr. Angew. Entomol. 5: 88-92. 1918.—It has been found that honey produced by Caucasus bees differs chemically from that produced by German bees. The former contains more levulose, the latter more dextrose. F_1 hybrids

produced honey like that of the Caucasus type. Back-crosses to German were made and the honey compared. Honey of F_1 as contrasted with German was clear yellow instead of reddish-brown, thinner in consistency, less aromatic, contained less non-sugary substance, but more invert sugar, less cane sugar, less acid, and less ash. Back-crosses gave more or less intermediate result for various honey qualities. The results must depend upon racial differences, as honey was collected from the same flowers at the same time of year. It is concluded that different races have different ferment which act upon nectar of similar composition to make different kinds of honey.—*P. W. Whiting.*

1454. ZELENY, CHARLES. Effective reverse selection in a bar-eye strain of *Drosophila* due to the appearance of mutations. [Abstract.] Anat. Rec. 23: 94. 1922.—Reverse selection started in the 34th generation of the high line of the white-bar series was continued for 7 generations. An effective decrease in mean facet number was obtained in the first 2 generations of both females and males and in the 7 generations of the females. The results are due to the appearance of 2 mutations, one, the ultra-bar,—which has been observed on several other occasions,—and the other a factor which causes a return of the mean to that of the unselected population. While the prevalence of lethal factors in the direct line of the selection stock suggests that the effectiveness of reverse selection may be due to their presence, all the evidence cannot be brought into agreement with such a view.—*Charles Zeleny.*

1455. ZELENY, CHARLES. The direction and frequency of mutation in the bar-eye series of multiple allelomorphs of *Drosophila*. Jour. Exp. Zool. 34: 203-233, 5 fig. 1921.—The bar-eye series of allelomorphs in *Drosophila melanogaster*, consisting of full, bar, and ultra-bar, is favorable material for the study of the nature of mutation. Bar appeared as a mutation from full-eye (Tice, 1913). A reoccurrence of the same mutation has not been obtained. Careful counts on 46,290 individuals from 23 full-eye stocks did not reveal any mutations to bar or ultra-bar. In 16 of the 23 stocks, the gene for full-eye had been obtained as the reverse mutation from bar to full. The recent origin of these stocks did not lead to any instability. Among 85,008 individuals from 29 bar stocks examined, 52 separate mutations to full were noted (a mutation coefficient of 0.00061), and 3 mutations to ultra-bar (coefficient of 0.00003). In these results neither the direction of origin of the stock nor the direction of selection under way had any effect on the frequency or direction of mutation. The mutations occurred either early or late in gonial history and in either sex. Ultra-bar originated from bar. Among 8,681 ultra-bar individuals examined, 5 mutations to full occurred, which gives a mutation coefficient of 0.00058 and agrees closely with the same value for bar to full. These mutations to bar give a coefficient of 0.00035. The greater frequency of reverse mutations is apparent from these data. There is no evidence of periodicity in the mutations. No difference was found in the rate of mutation from bar to full in stocks kept at 20°-22°C. and those kept at 27°.—*D. E. Lancefield.*

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 900, 930, 962, 996, 1014, 1023, 1075, 1080, 1081, 1082, 1086, 1089, 1112, 1123, 1186, 1197, 1228, 1284, 1302, 1332, 1375, 1438, 1591, 1761, 1787, 1797, 1840, 1843, 1861, 1868, 1967, 2003, 2012)

FRUITS AND GENERAL HORTICULTURE

1456. ANONYMOUS. Artificial frost for testing fruit. Sci. Amer. 124: 431. 1 fig. 1921.—This is a description of the Taylor method of determining by electrical measurements the temperatures at which small fruits and vegetables can be shipped or stored without being injured.—*Chas. H. Otis.*

1457. ANONYMOUS. Ever-bearing orange tree found at Tampa. *Sci. Amer.* 125: 143. 1921.—It is reported that this tree has been in bearing continuously for 8 years. A syndicate has been formed to propagate the tree through budding.—*Chas. H. Otis.*

1458. ANONYMOUS. More combination fruits and nuts. *Sci. Amer.* 125: 119. 2 fig. 1921.—Cashew (*Anacardium occidentale*), mamey (*Mammea americana*) and breadfruit of Polynesia (*Artocarpus communis*) are described.—*Chas. H. Otis.*

1459. ANONYMOUS. Oil for greenhouse fuel. *Sci. Amer.* 125: 163. 1921.

1460. ANONYMOUS. Orcharding. *Massachusetts Agric. Dept. Serv. Agric. Bull.* 2. 183 p. 1921.—This revision of a previous bulletin on apple growing includes the following papers: establishing an apple orchard, renovating old orchards, establishing and maintaining peach orchards, pruning fruit trees, grafting and budding, important apple insects, diseases of apples, apple storage, packing, etc.—*P. J. Anderson.*

1461. ANONYMOUS. Peach variety tests. *Rept. Hort. Exp. Sta. Vineland Sta. Ontario* 1919; 42-47. 1921.—Observations are noted on the pollination of certain varieties of the peach. Data are given showing a wide range in productiveness over a period of years for different trees of the same variety. These differences, considered due mainly to root variation, are indicated by illustrations.—*E. F. Palmer.*

1462. ANONYMOUS. [Rev. of: FAWCETT, WILLIAM. *The banana: its cultivation, distribution and commercial uses.* xi + 299 p. Duckworth and Co.: London, 1921.] *Nature* 108: 270. 1921.

1463. ANONYMOUS. Variety tests of plums. *Rept. Hort. Exp. Sta. Vineland Sta. Ontario* 1919; 37-41. 1921.—Data are given on age of bearing, productiveness, and dates of maturity for a large number of plums and prunes.—*E. F. Palmer.*

1464. ALLEN, W. G. The strawberry for the canner. *Ann. Rept. Oregon State Hort. Soc.* 12: 33-37. 1921.—This is detailed consideration of the value for canning purposes of the Wilson, Clark Seedling, Ettersburg 121, and Treble varieties. The last-named variety seems to be the most promising for canning.—*A. E. Murneek.*

1465. AUCHTER, E. C., T. H. WHITE, W. R. BALLARD, and ALBERT WHITE. Report on horticultural investigations. *Ann. Rept. Maryland Agric. Exp. Sta.* 32: xxv-xxxvi. 1918/1919.—Grape training and trellis experiments with 8 varieties have shown that the 2-wire Kniffin system is preferable. Fifteen *vinifera* varieties and 12 *vinifera* hybrids growing on the Station grounds show a wide range of vigor and health. Approximately 450 seedlings in the grape breeding project have fruited. The promising parents are Iowa, Winchell, Diamond, Worden, and Clinton. The most promising crosses are Winchell × Worden, and Diamond × Clinton. Attempts to produce apple trees from cuttings have failed. As a result of the apple and pear breeding projects approximately 1500 apple seedlings and 600 pear seedlings are growing on the Station grounds; some promising early red apples have been produced. The adaptability of different varieties of pecans, Persian walnuts, Japanese walnuts, and black walnuts to Maryland conditions is being studied.—Studies in asparagus fertilization have shown that larger yields are secured with commercial fertilizers than with barnyard manure, and that results are better when the fertilizer is applied in the spring. Comparisons of manure and commercial fertilizers for truck crops have shown that for most crops the latter are nearly as valuable in increasing yields as the former.—In studying the influence of growing plants for successive generations in soil treated with large amounts of plant foods, large amounts of dried blood seem to cause the greatest variations. Lettuce showed fasciation of the stem and a dark green stemmed sweet pea has been isolated. The cherry tomato showed considerable variation which extended into the 6th generation. As a whole, however, the plants

under different fertilizer treatments have not changed much under 12 years of treatment.—Some desirable tomato varieties, especially for canning purposes, have been developed through breeding.—*E. C. Aukher.*

1466. BAILEY, L. H. *The apple-tree.* 117 p., 13 fig. MacMillan Co.: New York, 1922.—This volume of 16 chapters, the 1st of a series to be known as The Open Country Books, is described by the author as a "version to the reader, not a treatise." But it is more than that, for it gives the reader some technical as well as practical information about the botany and growth of both tree and fruit as well as instruction in the care and management of a fruit plantation. It is obviously designed to win for the "apple tree" the admiration of lovers of outdoor life, and to interest the amateur in the possibilities of enjoying a knowledge of varieties and tree behavior.—*J. H. Gourley.*

1467. BAUR. *Neuere Wege der Obstzüchtung.* [New methods in breeding fruits.] Mitteil. Deutsch. Landw. Ges. 36: 720-722. 1921.—This lecture on fruit breeding was delivered before the section for fruit and vine culture of the Society at Weimar.—*A. J. Pieters.*

1468. BIOLETTI, FREDERIC T. *Cordon pruning.* California Agric. Exp. Sta. Circ. 229. 14 p. 1921.—In the unilateral horizontal cordon the trunk rises in a quarter circle from the ground to a height of 2-3 feet and then extends horizontally 6, 7, or 8 feet until it reaches the upper part of the bend of the next vine. The curved part of the trunk is kept bare and the arms are distributed every 8 or 10 inches along the upper side of the horizontal portion. This system, commonly used in Europe and recently adopted in California, has given good results with Emperor and in experiment vineyards, also with varieties such as Cornichon, Ohanez, Zabalkanski, and Malaga. The 1st 4 years of culture by this method are fully described.—*A. R. C. Haas.*

1469. BIOLETTI, FREDERIC T., H. C. H. FLOSSFEOER, and A. E. WAY. *Phylloxera-resistant stocks.* California Agric. Exp. Sta. Bull. 331. 82-139. 1921.—This investigation shows that certain stocks are excellent, that others are fair, and that others are probably poor for most of the principal grape varieties under the conditions of Yolo and Fresno Counties. The results are so tabulated as to show the behavior of a variety on each stock with which it was tested. Data are given regarding the percentage of 1st class vines secured by bench grafting, and the ratio of the diameter of the stock a few inches below and above the union. A ratio of 100 means that stock and scion are equal; ratios from 80 to 100 may be considered excellent and normal. Data are also given as to the vigor of the plants, death rate, and sugar content of fruit produced. A stock which increases the sugar as well as the crop has a double merit, and a stock giving small crops of low sugar content is correspondingly poor. The varieties on which yield data are given include: 5 raisin grapes,—Muscat, Black Corinth, White Corinth, Sultanina (Thompson), and Sultana; 5 table grapes,—Dattier de Beirut, Emperor, Cornichon, Tokay, and Malaga; 6 red-wine and 2 white-wine grapes. The raisin varieties include all that are generally used for drying, the table varieties the principal grapes used for shipping.—*A. R. C. Haas.*

1470. BOLDINOH, I. *Over de veelvormigheid van de klapper (Cocos nucifera L.).* [Concerning polymorphism of the coconut.] Dept. Landh. Nijv. en Handel Nederl.-Indië, Meded. Afdeeling Zaadteelt 1: 1-20. Fig. 1-76. 1920.—This introduction to the knowledge of *Cocos nucifera*, especially from the standpoint of morphology and varieties, outlines the problems involved and the lines along which further study must be directed. The subject is treated in popular style, with emphasis upon the illustrations. Analyses of the nuts of the following forms or varieties recognized by the natives were compared: gading, poejoeh, mersh, idjo, gendjah, dalem, bali, hoelan, and radjah. The amount of copra obtained from a single nut ranged from about 70 to 300 gm. and from nuts from the same tree, from 111 to 168 gm. The amount of oil varied from 40 to 280 gm. with the different forms, and 67 to 119 gm. with nuts from the same tree. Sufficient copra or oil content is a 1st requirement in choosing good seed

nuts. Analysis is especially desirable in selecting seed of the dwarf varieties (poejoeh and gading), among which many poor types occur. There appears nothing to justify the current Latin names of the varieties since the characters on which they are based are imitations of the native names. The writer emphasizes the need for finding morphologically divergent forms which combine high productivity with high oil content. Exceptional trees owing their superiority to external conditions should not be confused with trees the good characteristics of which are due to hereditary properties.—*I. Boldinh.*

1471. BONNET, L. O. The home vineyard. California Agric. Exp. Sta. Circ. 231. 11 p. 1921.—A list of 53 varieties of grapes for the home vineyard is given, with data regarding shape and flavor, size, color, period, vigor and climate. General directions for grape culture are given.—*A. R. C. Haas.*

1472. BROWN, W. S. Orchard fertilizing—profitable and otherwise. Ann. Rept. Oregon State Hort. Soc. 12: 70-77. 1921.—This general discussion of recent literature on orchard fertility refers especially to carbohydrate-nitrogen relations in the tree and such cultural practices as may influence these relations. Recent fertilizing tests by the Oregon Agric. Exp. Sta. show that in the case of apples, prunes, and red raspberries a fair increase of the crop was obtained, but maturity delayed, by early applications of nitrate of soda.—*A. E. Murneck.*

1473. BUNYARD, EDWARD A. A pomological pilgrimage. Jour. Pomol. 2: 56-63. 1920.—These observations on the fruit industry of Switzerland and Luxembourg emphasize varieties and practices. A short table of the yields of young standard apple trees is included.—*L. H. MacDaniels.*

1474. BUNYARD, EDWARD A. A revision of the red currants. Jour. Pomol. 2: 38-55. Fig. 6-10. 1920.—[This is a reprint from Gard. Chron. 62: 205-206, 217, 232, 237. 1917.] Currants from England, America, and Europe (70 varieties) were grown together for comparison and classification. The nomenclature was found to be much confused. The garden red currant is a composite of 3 species, *Ribes vulgare*, *R. rubrum*, and *R. petraeum*. Varieties are classified into 5 groups, under which varietal descriptions are given.—*L. H. MacDaniels.*

1475. CAMPBELL, J. A. Lemon culture. New Zealand Jour. Agric. 22: 340-347. 1921.—This consists of directions for New Zealand growers.—*N. J. Giddings.*

1476. CHACE, E. M., C. P. WILSON, and C. G. CHURCH. The composition of California lemons. U. S. Dept. Agric. Bull. 993. 18 p., 4 fig. 1921.—Eureka lemons have greater specific gravity than Lisbon or Villa Franca. The latter have more oil than Eureka, and the acid content of the 3 varieties is the same. Acidity is greatest in the early fall, specific gravity is highest in summer and lowest in winter, and oil content is lowest in late winter and spring and highest in the fall. There is a marked difference in sugar content between Eureka and Lisbon. No correlation was found between the color of the peel and composition of the fruit, but as thickness of peel increases the specific gravity decreases, as does acid content. No correlation was shown between color and thickness of peel. No difference in composition was noted between lemons grown inland and those grown on the coast.—*J. T. Buckholz.*

1477. CHASSET, L. The determination of pears. Jour. Pomol. 2: 11-15. Fig. 5. 1920.—This is an exposition of the author's scheme for the classification and identification of pear varieties, by which division into 3 main classes is made on the basis of the ratio of height to breadth. These classes are further divided according to shape, season, skin-color, stem, and flesh. The system is considered much more practical than older systems based upon the dessert, cooking, or cider quality of the fruit.—*L. H. MacDaniels.*

1478. CHILDS, LEROY. Spraying methods to improve pest control. Better Fruit 16: 5-6, 20. 1921.—In order to secure an effective, mist-like spray with the modern spray gun, the

proper amount of pressure must be maintained in the pumps. Two guns to a machine, 5 gallons per minute per gun at 300-325 pounds pressure, is a good economical unit. The sprayer must be so constructed as to pump 15 gallons per minute at 300 pounds. A low-pressure gun throws a coarse spray which does not cover the top part of the tree properly, thus resulting in poor control of both codling moth and scale. A table of average spray requirements of trees of various ages and for different applications is appended.—*A. E. Murneek.*

1479. COATES, LEONARD. The "peach-almond" hybrid. *Jour. Heredity* 12: 328-329. 2 fig. 1921.—This short note on the origin of the so-called "peach-almond" as known in California describes leaves and wood as resembling the almond, and the fruit as like an immature peach. The tree has "much more vigor than either peach or almond seedlings."—*Oliver Olson.*

1480. COVILLE, FREDERICK V. Directions for blueberry culture, 1921. U. S. Dept. Agric. Bull. 974. 24 p., 29 pl. 1921.—This discussion of blueberry culture includes a method of propagation which consists of a special process of layering called stumping. Blueberries thrive best in soils so acid as to be considered worthless for ordinary agricultural purposes. Blueberry breeding has been carried on for 10 years with the result that a number of hybrids have been selected which produce berries of a large size and high quality.—*R. F. Crawford.*

1481. DARLINGTON, P. S. Orchard cover crops. *British Columbia Fruit Growers Assoc. Ann. Rept.* 31: 59-64. 1920.—Alfalfa is strongly recommended and the conditions for its most successful use are discussed.—*J. W. Eastham.*

1482. DAVISON, J. H. The budding of citrus trees. *New Zealand Jour. Agric.* 22: 230-233. 2 fig. 1921.—Stock having a diameter of $\frac{1}{4}$ inch was found most desirable for budding, although much smaller stocks have often been recommended.—*N. J. Giddings.*

1483. DAVIS, M. B. The possibility of the transmission by asexual propagation of the high yielding ability of individual apple trees. *Sci. Agric.* 2: 120-124. 1921.—Scions of Wealthy were grafted on Rose of Stanstead and Dartmouth crab stock. Parent trees yielded 104+, 78+, and 41 gallons respectively in 8 years. Progeny of the poorest yielding tree gave the lowest yields, and progeny of the highest yielding gave the highest yields. Progeny of the highest yielding tree were superior in size and vigor.—*B. T. Dickson.*

1484. DAVIS, M. B. The relation of pruning and fertilization to fruit bud formation. *Sci. Agric.* 2: 43-49. 1921.—This is a review of work on fruit bud formation, nitrogen-carbohydrate-moisture balance, biennial bearing, pollination, and pruning.—*B. T. Dickson.*

1485. DURHAM, HERBERT E. Some etymological notes. *Jour. Pomol.* 2: 115-129. 1921.—This is an account of literary researches to determine the origin and derivation of such commonly used names as Pearmain, Reinette, and Codlin. The derivation is in many cases obscure. It is hoped that a new system of registering new varieties may be developed to prevent future confusion.—*L. H. MacDaniels.*

1486. FLICKINGER, ROBERT E. The new hybrid plum. *Rept. Iowa State Hort. Soc.* 55: 79-86. 1920.—This article discusses various hybrid plums such as the Sapa, Opata, Waneta, Gold, Shiro, Toka, and describes the character of the tree, fruit, etc.—*L. H. Pammel.*

1487. GREENE, WESLEY. Evolution of the apple. *Rept. Iowa State Hort. Soc.* 54: 261-263. 1919.—A discussion is given of the European apple, *Pyrus Malus*, *P. baccata*, and *P. prunifolia*. Cox listed 102 varieties in 1817, of which only a few, like the Maiden Blush and Rhode Island Greening, remain.—*L. H. Pammel.*

1488. H., J. H. The book of the mango. [Rev. of: BURNS, W., and S. H. PRAYAG. The book of the mango. 98 p. 1921.] *Kew Bull.* 1921: 285-286. 1921.

1489. H., J. H. The date palm (*Phoenix dactylifera*) and its cultivation in the Punjab. [Rev. of: MILNE, D. The date palm (*Phoenix dactylifera*) and its cultivation in the Punjab. 163 p., 60 fig. 1918.] Kew Bull. 1921: 95-96. 1921.

1490. H., J. M. The coconut. [Rev. of: COPELAND, E. B. The coconut. 2nd ed., xvi + 225 p., 23 fig. 1921.] Kew Bull. 1921: 288. 1921.

1491. HATTON, R. G. Results of researches on fruit tree stocks at East Malling. Jour. Pomol. 2: 1-10. Fig. 1-4. 1920.—A summary is presented of the work done at East Malling upon apple, pear, plum, and quince stocks. It is possible to classify the different stocks known in the trade into types based on botanical characters sufficiently constant to furnish a sound basis of classification. In most cases these types can be kept constant by vegetative propagation. They markedly influence the trees worked thereon in vigor, precocity in fruiting, and liability to disease. The influence of scion on stock is appreciable but not sufficient to counterbalance the effect of the stock. The indications are that pear stocks capable of vegetative propagation can be found that will have a dwarfing effect equal to that of the quince.—*L. H. MacDaniels.*

1492. HOWARD, W. L. Use of dust sprays in California. Better Fruit 15¹: 3-4. 1921.—With the exception of dry sulphur dust for mildew of grapes, no dry sprays are used as fungicides in California. A large number of dust sprays are applied for the control of various insects, e.g., sulphur for red spider on almond, peach, and prune, and nicotine sulphate with kaolin clay as a carrier for leaf aphid of walnut, thrips on prunes and pears, and rosy apple aphid.—*A. E. Murneek.*

1493. LANTZ, H. L. New apples bred by Iowa State College. Rept. Iowa State Hort. Soc. 55: 225-230. 1920 [1921].—The author discusses the origin of Patten Greening; also of Eastman and Brilliant, respectively 1880 and 1881 seedlings of Fameuse; and of hybrid pears. The College has 12,000 cross-bred seedlings of various combinations of apples, including such types as Hibernal, Malinda, Northwestern Greening, Delicious, Wealthy, Jonathan, etc.—*L. H. Pammel.*

1494. LONG, CLAYTON L. The value of thinning. Better Fruit 16¹: 6, 16. 1921.—Thinning increases size, color, and the total value of the current crop, and maintains the vigor of the trees. Thinning is most economical just after the "June drop." On smaller varieties the fruit should be thinned 6-7 inches apart, increasing this to 8-10 inches for the larger varieties.—*A. E. Murneek.*

1495. McDONALD, M. The story of Edward Coates, the prune idealist, investigator, practical fruit grower, and nurseryman. Ann. Rept. Oregon State Hort. Soc. 12: 86-92. 1921.—A bud sport of the Petite prune, locally known as "Coates 1418" prune, is described. The fruit is roundish in form, of the same color but larger in size, and of a higher sugar content than the common French or Petite prune.—*A. E. Murneek.*

1496. McGEE, JOHN. New prunes for the Willamette Valley. Ann. Rept. Oregon State Hort. Soc. 12: 84-86. 1921.—The New Oregon prune, originated by Andrew Vercier of Salem, Oregon, is thought to be a chance seedling between the Italian and Petite prunes. The tree is a heavy yielder, and the fruit is larger than either of the probable parents and of high sugar content.—*A. E. Murneek.*

1497. MCPHIE, EUGENE F. The successful transportation of fruits and how it can be promoted by the American Pomological Society. Proc. Amer. Pomol. Soc. 1920: 73-80. 1921.

1498. MIDDLETON, W. A. Apples in the Okanagan. Sci. Agric. 1: 253-256. 1921.—This paper deals with the average yields of leading varieties. For Kelowna and north, Mc-

Intosh, Delicious, Rome Beauty, Wealthy and Duchess are recommended; for south of Kelowna, Delicious, Rome Beauty, Winesap, Stayman, Jonathan, and Gravenstein.—*B. T. Dickson.*

1499. MORRIS, O. M. Studies in apple pollination. Washington [State] Agric. Exp. Sta. Bull. 163. 92 p., 6 fig. 1921.—This work includes a study of self-sterility and self-fertility, insect pollination, duration of the pollinating period, interfertility of varieties, June-drop and its relation to seed production, and the seed content of one-sided apples.—*F. D. Heald.*

1500. MORRIS, O. M., and ROY LARSEN. Orchard soil management and fertilization. Washington [State] Agric. Exp. Sta. Popular Bull. 121. 23 p., 2 fig. 1921.—Orchard soil management and fertilization are considered with special reference to the Wenatchee Valley. Results obtained from various commercial fertilizers compared with clean culture and the use of cover crops are given. Commercial nitrogenous fertilizers are recommended for securing immediate beneficial results, but barnyard manure and leguminous cover crops are preferable for general and permanent soil improvement.—*F. D. Heald.*

1501. NEWMAN, L. H. "Hardiness" in plants which live in the open over winter. [Discussion of (1) HEDLUNO, T. Om Frosthardigheten hos varia kalljordsvaxter. Svensk Bot. Tidskr. 6: 1912. (2) NILSSON-EHLE, H. Zur Kenntnis der Erhöhlichkeitsverhältnisse der Eigenschaft Winterfestigkeit beim Weizen. Zeitschr. Pflanzenzucht. 1: 3-12. 1921. (3) ÅKEBERG, Å., HJ. JOHANSSON, och B. PLATON. Fortsatta undersökningar rörande suckerhaltoch torrsbstanshåll hos några höstvitesorter. Sveriges Utsadesfor. Tidskr. 28: 216-224. 1918 (see Bot. Ahsts. 5, Entry 254; 6, Entry 646).] Sci. Agric. 1: 209-212. 1921.—"We may conclude from the above investigations that the question of hardiness in plants must be considered both from the standpoint of the influence of breeding as well as that of feeding. In other words strains which have shown themselves to be naturally hardy should be chosen for those districts which are likely to suffer from severe conditions and these strains should then be 'fed' and handled so as to enable them to prepare themselves to withstand the damaging effects of winter and early spring to the best possible advantage."—*B. T. Dickson.*

1502. PEARCY, KNIGHT. The nut industry of the Northwest. Better Fruit 16: 17-20. 1921.—That section of the Pacific Northwest lying west of the Cascade range can produce chestnuts, walnuts, and filberts commercially. No commercial chestnut groves have been set out in this region, but a few scattered plantings and individual trees have invariably produced good crops. About 8000 acres have been planted to walnuts in western Oregon. If proper precautions are taken in choosing the site in respect to soil requirements and air and water drainage, walnut growing is highly remunerative. Franquette is the leading variety. Considering the present popularity and planting activities, the filbert bids well to become the most popular nut grown in the Pacific Northwest. The tree is adapted to a large variety of soil and climatic conditions, is comparatively free from disease and insect pests, and bears regularly and at an early age.—*A. E. Murneck.*

1503. POPENOE, WILSON. The native home of the Cherimoya. Jour. Heredity 7: 330-336. 9 fig. 1921.—The Cherimoya (*Annona cherimola* Mill.), one of the finest fruits of the tropics, has been considered indigenous in Mexico, Central America, Ecuador, and Peru, the best authorities favoring the 2 last-named countries. The writer, who found the tree growing abundantly in the wild state in southern Ecuador, presents evidence to show that its native home is in this region. A comparison is also made between the wild trees and their fruits and those of the cultivated varieties of other countries.—*P. G. Russell.*

1504. QUARNBERG, A. A. Filbert culture in the county of Kent, England. Ann. Rept. Oregon State Hort. Soc. 12: 47-51. 1921.—Kentish Cob or Lamherit, probably a strain of Du Chilly, is the most popular variety of filbert grown in Kent. The tree is a strong grower and prolific, bearing large, attractive nuts of good flavor. Filberts are commonly inter-planted

in fruit orchards, are trained to a single stem, and pruned regularly and systematically. Cultivation is mainly by hand. To keep the trees in good bearing condition barnyard manure or other fertilizers are incorporated with the soil. The average yield is 1000-1700 pounds of dried nuts per acre.—*A. E. Murneek.*

1505. RAWES, A. N. Self-fertility and self-sterility in plums. *Jour. Roy. Hort. Soc.* 46: 353-356. *Fig. 199-203.* 1921.—This is a preliminary account of investigation begun in 1919 on self-fertility and self-sterility of plums. Two trees of each variety are tested in each case, the trees being in pots in an orchard house. Eleven varieties proved self-sterile, 3 self-fertile, and 4 partially self-fertile. No differences due to foreign pollen were observed in the size or shape of fruit or stone. Of 16 varieties examined, Frogmore Orleans had the lowest percentage (8 per cent) of misshapen and apparently had pollen grains, Coe's Golden Drop and Bryanston Gage the largest (25 per cent); the average in the other varieties was 17 per cent.—*J. K. Shaw.*

1506. REED, CHARLES D. How the United States Weather Bureau can help the horticulturist. *Rept. Iowa State Hort. Soc.* 55: 138-140. 1920.—The author discusses the utilization of the direction of the wind in treating such insects as the apple aphid, which is sensitive to chilly winds. The aphid is therefore generally found on the lee side of tender opening buds.—*L. H. Pammel.*

1507. REEVES, ELMER. Pears for the home orchard. *Rept. Iowa State Hort. Soc.* 54: 24-25. 1919.—Experiences in growing Russian and common pears at Waverly, Iowa, are given.—*L. H. Pammel.*

1508. ROBERTS, R. H. Off year apple bearing and apple spur growth. *Jour. Pomol.* 2: 16-37. 1920.—This is a reprint in full of Wisconsin Agric. Exp. Sta. Bull. 317.—*L. H. MacDaniels.*

1509. ROEDING, GEORGE C. Why not grow root stocks in the U. S. A.? *Amer. Nurseryman* 35: 7. 1922.

1510. ROSS N. M. Results of fruit culture on the forest nursery station at Indian Head (Sask[atchewan].) *Sci. Agric.* 2: 50-51. 1921.—This paper deals with results of trials in growing raspberry, gooseberry, strawberry, cherry, and apple varieties on Canadian prairies.—*B. T. Dickson.*

1511. SAX, KARL. Studies in orchard management. II. Factors influencing fruit development of the apple. *Maine Agric. Exp. Sta. Bull.* 298. 53-84. *Fig. 36.* 1921.—Seed content of apples is correlated with setting and with regularity in shape more than with size of mature fruits. With seed present, the food supply influences the setting and development of fruit. Cross-pollination by bees occurred through a distance of over 100 yards.—*Donald Folsom.*

1512. SAX, KARL, and JOHN W. GOWEN. Productive and unproductive types of apple trees. *Jour. Heredity* 7: 290-300. *Fig.* 1921.—In a study of 881 Ben Davis apple trees 3 main habits of growth, each with a characteristic yield of fruit, were found. Type 1, a large, vigorous, open-headed tree with large, drooping branches carrying many laterals and abundant fruit spurs, is most productive. Type 3, a rather small tree with small, upright, slender branches having few laterals or spurs is decidedly unproductive. Midway between these is type 2. All the trees are of the same age and the type differences are not due to orchard management. The differences in yield are shown to be partly dependent on the size of the trees for each type. The reasons for the occurrence of these 3 types within a clonal variety is not entirely obvious. A study of soil heterogeneity for this orchard shows that soil is partly responsible for the differences. A study of the relation of stock to productivity shows that it also plays a part.

Literature on the scion in relation to productivity shows contradictory evidence, but on the whole favors the view that within a clonal variety bud variation plays little part in differences in yield.—*John W. Gowen.*

1513. SCHIMPFFF, W. E. The cranberry industry in Oregon. Ann. Rept. Oregon State Hort. Soc. 11: 22-26. 1919.—The early history of cranberry growing in Oregon is discussed. Commercially the industry in the state dates back to 1910. Some phenomenal yields are given. The natural requirements of a good cranberry bog are enumerated; these are found in the coastal region of the state, particularly in Clatsop county.—*A. E. Murneek.*

1514. SCHUSTER, C. E. Experiments in cherry breeding. Better Fruit 15¹²: 12-13. 1921.—[Reprint from Crop Pest and Hort. Rept. Oregon Agric. Exp. Sta. (see Bot. Absts. 9, Entry 832).]

1515. SHAW, J. K. The propagation of apple trees on their own roots. Massachusetts Agric. Exp. Sta. Bull. 190. 73-96, pl. 1-4. 1919.—After enumerating the advantages to be secured by having trees on roots of known varieties, the author describes his experiments of a number of years to determine the best method of getting them on their own, or known, roots. He finds the nurse-root method best. The scion is whip-grafted on a short piece of root and planted deeply. After 2-3 seasons' growth the tree is dug, the nurse-root removed, and the tree replanted to continue its growth on roots developed from the scion. It may then be budded or grafted to any other variety if desired. Experimental data are given on a large number of varieties, showing differences in the readiness with which they produce roots from the scion. These varietal differences bear some relation to the density of the wood and to the thickness of the cambium layer at the dormant season.—*P. J. Anderson.*

1516. SNYDER, S. W. Native nuts and hybrids that are worthy of planting on home grounds. Rept. Iowa State Hort. Soc. 54: 28-30. 1919.—This paper describes a wild hybrid hickory nut, of which the shagbark is one parent; bitternut or pecan may be the other. Some nuts have red meats, others from the same tree have cream colored meats.—*L. H. Pammel.*

1517. STAHL, J. L. Methods of training bush fruits. Better Fruit 15¹²: 4, 16. 1921.—This is a brief account of the most recent and most popular methods of training raspberries, blackberries, and loganberries in the Puyallup Valley, Washington.—*A. E. Murneek.*

1518. STAHL, J. L., and ARTHUR FRANK. Winter injury of berries. Monthly Bull. Western Washington Exp. Sta. 9: 34-36. 1921.—This brief discussion of the symptoms and effects of winter injury to raspberries, blackberries, and loganberries is based on experience in western Washington. Predisposing factors and preventive measures are considered.—*F. D. Heald.*

1519. STEVENS, NEIL E., and H. F. BERGMAN. The relation of water-raking to the keeping quality of cranberries. U. S. Dept. Agric. Bull. 900. 12 p. 1921.—Unusual conditions in parts of Wisconsin make water-raking possible in harvesting cranberries. By flooding the vines, the berries which float on or near the surface can be harvested with rakes. The present investigation (1918-20) has shown that the keeping quality of water-raked berries is somewhat inferior to that of dry-raked ones from the same sections, and about equal to that of hand-picked berries. A number of practical suggestions are given.—*A. Dorothy Bergner.*

1520. THORNBERRY, H. The relative values of cover crops. Better Fruit 16¹²: 9. 1921.—Experiments conducted for 5 years with clover and peas as cover crops for an orchard showed that clover is preferable for this purpose. Clover was grown 2 years in succession, then plowed under. Results were particularly conspicuous with McIntosh. The average height, average diameter, and yield for a 4-year period were markedly increased in this variety when clover was used instead of peas.—*A. E. Murneek.*

1521. TOOTHAKER, A. R. Experience with cherries. Rept. Iowa State Hort. Soc. 55: 216-218. 1920.—The author discusses soils, varieties, age of trees for planting, pruning, and diseases of cherry. Reference is made to yellow leaf disease (*Cylindrosporium Padi*).—*L. H. Pammel.*

1522. WESTOATE, J. M. Report of the horticultural division. Hawaii Agric. Exp. Sta. Rept. 1920: 17-26. *Pl. 1, fig. 1.* 1921.—Investigations with avocados, mangoes, pineapples, papayas, grapes, strawberries, and Macadamia nuts are reported. Formulae for preparing grafting wax suitable for tropical conditions, and instructions for packing plants and cutting for shipment where it is impracticable to ship in soil are given. Nicotine sulphate spray was found effective for mites. A device for securing bottom heat in the propagation of cuttings is described.—*J. M. Westgate.*

1523. WHITE, ELIZABETH C. Development of the cultivated blueberry. Proc. Amer. Pomol. Soc. 36/37: 48-61. 1921.—Some low-bush hybrids, obtained by crossing a high-bush blueberry (*Vaccinium corymbosum*) with a low-bush one (*V. angustifolium*) bore berries about $\frac{1}{2}$ of an inch in diameter. The author relates her experiences in growing, harvesting, and marketing blueberries.—*W. E. Whitehouse.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1524. ANONYMOUS. A new strain of early tulips. Florists' Exchange 51: 307. 1921.—Five promising new varieties of forcing tulips, hybrids between Duc. van Tholl and Darwin varieties, combine the earliness of the former with the colors and longer stems of the latter. The first crosses were made in 1909.—*Lua A. Minns.*

1525. ANONYMOUS. A sidelight on Iris history. Florists' Exchange 49: 1447. 1920.—The writer reviews an article, by R. W. Wallace in The Garden, on the introduction of *Iris trojana*.—*Lua A. Minns.*

1526. ANONYMOUS. Additions to gardens. Kew Bull. 1920: 33-36. 1920.

1527. ANONYMOUS. Aloe specimens from Pretoria. Kew Bull. 1920: 138. 1920.—This is a notice of a collection of species of South African aloes which were grown at Pretoria.—*E. Mead Wilcox.*

1528. ANONYMOUS. Antirrhinums at Wisley, 1920. Jour. Roy. Hort. Soc. 46: 357-360. 1921.—This is a report of a trial of 233 stocks of Antirrhinums. The seed was sown in boxes and from 24 to 30 plants of each variety were planted out, similar shades being grouped together to make comparisons of the different varieties. A few stocks were obviously untrue or badly mixed. A classified list with brief descriptions is given.—*J. K. Shaw.*

1529. ANONYMOUS. Coco-de-mer in the Seychelles. Kew Bull. 1921: 254-255. 1921.—This is an account of the measures being taken to protect and extend the cultivation of this interesting palm (*Lodoicea*).—*E. Mead Wilcox.*

1530. ANONYMOUS. Fifty years among cyclamen. Florists' Exchange 51: 177. 1921.—The writer notes the effect of Quarantine 37 in stimulating demand for cyclamen (*Cyclamen persicum* vars.) as flowering pot plants for the early winter trade, and devotes the larger part of the article to a sketch of the life and work of Thomas Avery of Harlington, Middlesex, England, who, since 1871, has devoted a large part of his time to the improvement of the cyclamen.—*Lua A. Minns.*

1531. ANONYMOUS. Gladiolus culture in America vs. Holland. Florists' Exchange 51: 12. 1921.—The writer tells of the experience of P. Vos & Son, formerly of Holland, now of Mt. Clemens, Michigan. They found in America suitable land reasonably priced so that

intensive hand cultivation need not be used as in Holland. Also, rotation of crops can be practiced, which kills out the undesirable cormels left in the soil and thus avoids mixing varieties, which often occurs where land is cropped continuously with gladioli. They also found a more suitable climate, especially for ripening and digging the corms.—*Lua A. Minns.*

1532. ANONYMOUS. How Japanese dwarf trees are raised. *Sci. Amer.* 124²: 473. 5 fig. 1921.

1533. ANONYMOUS. John Cook of Baltimore. *Florists' Exchange* 52: 1192. *Fig. 1.* 1921.—This short sketch of this aged rosarian (88 years old) includes a list of his best known seedlings with class, year of introduction, parentage, and descriptive notes of each.—*Lua A. Minns.*

1534. ANONYMOUS. Lilies from seed. *Florists' Exchange* 51: 486. 1921.—The writer reports growing Easter lilies from seed with results which compare favorably with those from imported bulbs.—*Lua A. Minns.*

1535. ANONYMOUS. List of aloes mentioned in "Our Aloes," by Dr. Pole-Evans, cultivated at the Royal Botanic Gardens, Kew. *Kew Bull.* 1920: 138-139. 1920.

1536. ANONYMOUS. List of seeds of hardy herbaceous plants and of trees and shrubs. *Kew Bull.* 1920: (Appendix 1): 1-25. 1920.

1537. ANONYMOUS. List of seeds of hardy herbaceous plants and of trees and shrubs. *Kew Bull.* 1921: (Appendix 1): 1-36. 1921.—This is a list of seeds grown during 1920 for exchange with botanic gardens.—*E. Mead Wilcox.*

1538. ANONYMOUS. Making evergreen transplantation practical. *Sci. Amer.* 125²: 30. 2 fig. 1921.—The invention of a transplanting receptacle made of metal, with collapsing bottom and sides, is described.—*Chas. H. Otis.*

1539. ANONYMOUS. Old garden flowers. II. *Amer. Bot.* 28: 1-6. 1922.

1540. ANONYMOUS. Perennial asters (*Michaelmas daisies*) at Wisley, 1920. *Jour. Roy. Hort. Soc.* 46: 370-381. 1921.—Tests of 168 stocks of perennial asters are reported. A classified list of varieties with brief descriptive notes is given.—*J. K. Shaw.*

1541. ANONYMOUS. The red poppy for Memorial Day. *Florists' Exchange* 51: 136. 1921.—The writer suggests the use of the Shirley poppy (variety of *Popaver Rhoeas*) or of the Tulip poppy (*P. glaucum*), instead of the field poppy (*P. Rhoeas*), as distribution of the latter is prohibited. *P. glaucum* is deeper in color than the field poppy but has greater stamina, with smooth leaves and thick stems.—Poppies should be cut just as the calyxes crack, the cut ends of the stems lightly scorched, and placed in water a few hours before shipping.—It is probable that the annual poppy can, in many sections of the U. S. A., be flowered in the open by the end of May either from sowings made the previous fall, or in frames at the end of February and later exposed by removing the sash.—*Lua A. Minns.*

1542. B[EAN], W. J. (Notes on interesting trees planted at Tortworth by Lord Ducie.) *Kew Bull.* 1921: 317. 1921.

1543. DARLINGTON, H. R. Garden roses. *Jour. Roy. Hort. Soc.* 46: 323-335. 1921.—For convenience garden roses may be divided into 2 groups,—the dwarf varieties grown in beds and borders, and the climbing roses. The intermediate group may be disregarded. Each of these 2 groups may be subdivided according as they bear large, more or less solitary flowers or carry their flowers in clusters; the former are more numerous and important in the dwarf

group and the latter among the climbers. The qualities that give a variety its place in general esteem are named and discussed under 10 heads. The character and value of a considerable number of varieties are discussed.—*J. K. Shaw.*

1544. DUNBAR, JOHN. How to grow rhododendrons. *Jour. New York Bot. Gard.* 22: 184-190. 1921.

1545. GOOSSENS, V. Contributions à l'étude des plantes économiques introduites au Congo Belge. 1°—Note sur le palmier à sucre (*Arenga saccharifera* Labill.). [Contributions to the study of economic plants introduced in the Belgian Congo. 1. Note on the sugar palm (*Arenga saccharifera*).] *Bull. Agric. Congo Belge* 12: 215-220. 6 fig. 1921.—This palm was introduced in the botanic gardens of Eala about 20 years ago. From the standpoint of the production of fats, of sagou, and sugar-sap, it offers nothing of interest. The plant is extremely ornamental. Fibre could be obtained from it.—*Henri Micheels.*

1546. GOOSSENS, V. Contributions à l'étude des plantes économiques introduites au Congo Belge. 2°—Note sur l'arbre à pain (*Artocarpus incisa* L. f.). [Contributions to the study of economic plants introduced in the Belgian Congo. 2. Note on the bread tree (*Artocarpus incisa*).] *Bull. Agric. Congo Belge* 12: 220-235. 10 fig. 1921.—*Artocarpus incisa* L. f. var. *semnifera* and *A. integrifolia* L. are not to be recommended from a cultural standpoint. Goossens studied the culture of *A. incisa* and shows its advantages. One hectare yields 40,000-60,000 kgm. of fresh fruits per year, or 13,500-16,880 kgm. of dry pulp (12,196-15,246 kgm. of flour). This production is obtained only after 5 years, but intercalated plantations of banana, peanut, etc., could be established.—*Henri Micheels.*

1547. GRIFFITHS, DAVID. The production of the Easter lily in northern climates. *U.S. Dept. Agric. Bull.* 962. 31 p., 14 fig. 1921.—A detailed discussion of the production of the Easter lily on a seedling and a vegetative basis is given. The severity of the winters around Washington, D. C., and farther north makes it necessary either to propagate vegetatively after the 1st year, or to use bulbs which form large crowns that remain dormant during autumn. From such a hardy dormant strain permanent plantings can be made which will be secure from freezing if ordinary precautions are taken.—*Catherine M. Smith.*

1548. HEYNE, G. A. The park as an educational factor in promoting civic improvement and its value for the florist. *Rept. Iowa State Hort. Soc.* 54: 326-327. 1919 [1921].

1549. MASON, RALPH T. Hardy rose in southeastern Iowa. *Rept. Iowa State Hort. Soc.* 54: 64-65. 1919.

1550. MESTNAGH, M. L'exploitation des palmiers Elaeis à la Station Experimental de Gazi (Stanleyville). [Exploitation of Elaeis palms at the experimental station of Gazi (Stanleyville).] *Bull. Agric. Congo Belge* 12: 327-340. 11 fig. 1921.—Geographic position, climate and season, soil, population and management of the plantations, cultures, varieties, flowering, maturity, production yields, and preparation of palm oils are considered. Results obtained by the native method of heating and pressing the fruit-pulp, composition of the fruit, and yields of palm oil are given. Methods of extracting and purifying the oil are described. Transportation and preservation of the oil are discussed. Epiphytic plants, enemies, and diseases are also considered.—*Henri Micheels.*

1551. NANNAN. L'exploitation des palmiers Elaeis à la Station Experimentale de Ganda-Sundi (Bas-Congo). [The exploitation of the Elaeis palms at the experimental station of Ganda-Sundi (Lower Congo).] *Bull. Agric. Congo Belge* 12: 309-313. 1921.—The number of plants, age, principal varieties, proportion of male and female flowers and cultural practices are discussed.—*Henri Micheels.*

1552. NORTON, J. B. S. The leading commercial dahlias. *Florists' Exchange* 52: 869. 1921.—The writer classifies and describes 50 dahlia varieties, old and new, as the most worthy of commercial notice. The 1st 25 listed are best suited for garden use.—*Lua A. Minns.*

1553. STOCKER. Les palmeraies du district de l'Ubangi. [The palm groves of the district of Ubangi.] *Bull. Agric. Congo Belge* 12: 313-320. 1921.

1554. STOCKER. Les palmeraies d'Elaeis du territoire de Doruma (Haute-Uélé). [The Elaeis palm groves of the territory of Doruma (Upper-Uélé).] *Bull. Agric. Congo Belge* 12: 321-327. 1921.

1555. TAYLOR, W. H. Farm hedges. *New Zealand Jour. Agric.* 23: 284-288. 1921.—Ten varieties of farm hedge are described and their establishment discussed with particular reference to planting and trimming.—*R. J. Garber.*

1556. VANDERYST, H. Contributions à l'étude du palmier à huile au Congo Belge. 9. La récolte des régimes de l'Elaeis. [Contribution to the study of the oil palm in Belgian Congo. 9. The gathering of fruit of Elaeis.] *Bull. Agric. Congo Belge* 12: 305-309. *Illus.* 1921.—The author has devised a simple method based on the use of a pulley to replace the dangerous method commonly used.—*Henri Micheels.*

1557. VEITCH, P. C. M. Magnolias. *Jour. Roy. Hort. Soc.* 46: 315-322. *Fig. 188-190.* 1921.—Different types of Magnolia are mentioned and their characters and value as ornamental trees or shrubs described. An account is given of a new form, *Magnolia Veitchii*, a hybrid of *M. conspicua* and *M. Campbelli*.—Magnolias may be propagated by layers, from seed, or by grafting, the last being the most generally used method. The author has transplanted Magnolias long distances with balls of earth with great success. Evergreen species should be grown in pots and may be transplanted during many months in the year.—*J. K. Shaw.*

1558. YATES, ROSE LAMARTINE. Pioneer work in Nigeria: the Sokoto Gardens. *Jour. Roy. Hort. Soc.* 46: 336-345. *Fig. 191-198.* 1921.—The location, climate, and topography of Sokoto are described, and a list of flowers and vegetables which have succeeded is given.—*J. K. Shaw.*

VEGETABLE CULTURE

1559. ANONYMOUS. Early peas at Wisley, 1920. *Jour. Roy. Hort. Soc.* 46: 382-389. 1921.—This is a report of tests of 120 stocks of early peas, with recommendations by the Judging Committee. A classified list of the varieties grown and brief descriptive notes are given.—*J. K. Shaw.*

1560. ANONYMOUS. Parsley at Wisley, 1919 and 1920. *Jour. Roy. Hort. Soc.* 46: 395-397. 1921.—Parsley (43 stocks) was tested, and the awards of the Judging Committee and a classified list of varieties, with brief descriptions, are given.—*J. K. Shaw.*

1561. ANONYMOUS. Tomato variety tests. *Rept. Hort. Exp. Sta. Vineland Ontario* 1919: 49-51. 1921.—Data are given on a considerable number of varieties showing variations in earliness and yield between different strains of the same variety from different seedsmen.—*E. F. Palmer.*

1562. BOUQUET, A. G. B. Vegetables of importance in Oregon coast counties. *Ann. Rept. Oregon State Hort. Soc.* 11: 32-37. 1919.—The value of a cool coastal climate and a retentive soil for the production of vegetables of high quality is discussed. The following vegetables do especially well in the coast counties of Oregon: cabbage, onions, head lettuce, and asparagus. Both local and distant marketing of the crop is emphasized.—*A. E. Murneek.*

1563. BOYCE, N. Field experiments with sweet potatoes, Grafton experiment farm, Agric. Jour. New South Wales 32: 891-892. 1921.—Yields and notes are presented on 5 varieties received from America.—*L. R. Waldron.*

1564. FITCH, C. L. Commercial curing and storing of sweet potatoes in the South. Facts for Iowa growers. Rept. Iowa State Hort. Soc. 54: 293-295. 1 pl. 1919.

1565. FITCH, C. L. Modern cucumber growing. Rept. Iowa State Hort. Soc. 55: 305. 1920.—A discussion is given of enemies of cucumber culture, fertilizers, and treatment for insects and diseases.—*L. H. Pammel.*

1566. HOOPES, L. B. Seed growing and saving at Muscatine. Rept. Iowa State Hort. Soc. 55: 330-331. 1920.—The harvesting and cleaning of asparagus, muskmelon, and water-melon seed are discussed.—*L. H. Pammel.*

1567. HYDE, W. C. Tomato variety test at Nelson. New Zealand Jour. Agric. 23: 171-173. 1921.

1568. PAMMEL, L. H. Weeds and their relation to onion growing. Rept. Iowa State Hort. Soc. 55: 322-326. 1920.—A discussion is given of purslane (*Portulaca oleracea*) and its treatment, and the longevity of various weed seeds in the soil.—*L. H. Pammel.*

1569. RUDNICK, R. A. Varieties of pumpkins and squashes. Rept. Iowa State Hort. Soc. 54: 300-301. 1919.—This author gives a brief account of the difference between *Cucurbita Pepo* and *C. maxima*.—*L. H. Pammel.*

1570. STRONG, W. J. Greenhouse cucumber breeding. Sci. Agric. 2: 62-64. 1921.—A variety of greenhouse cucumber combining the good qualities of Sutton's Everyday, Fisk's White Spine, and Princess has been tested since 1910 in order to improve it and place it on the market.—*B. T. Dickson.*

1571. THOMPSON, H. H. Sweet potato possibilities. Agric. Jour. [British Columbia] 6: 264-265, 271. 1921.—The writer has grown this crop successfully at Peachland in the Southern Okanagan and gives recommendations based on local experience.—*J. W. Eastham.*

1572. WAID, C. W. Vegetable forcing in Michigan, Ohio, and adjacent states. Rept. Iowa State Hort. Soc. 55: 313-316. 1920.—The author discusses lettuce, tomatoes, and cucumbers; also disease control.—*L. H. Pammel.*

1573. WALFORD, HAL. C. Sweet potato production. Rept. Iowa State Hort. Soc. 55: 309-311. 1920.—The author describes sweet potato culture at Conesville, a district in southeastern Iowa on the sandy bottom of the Cedar and Iowa Rivers, where 270 acres produced 40,000 bushels of Nancy Hall. Methods of cultivation and storage are discussed.—*L. H. Pammel.*

1574. WHITE, THOS. H. Experiments with fertilizers on greenhouse crops. The pollination of greenhouse tomatoes. Maryland Agric. Exp. Sta. Bull. 222. 75-101. 1918.—Results are given of various manure and chemical fertilizer applications on roses, carnations, and chrysanthemums. Results of pollination studies show that of 10 varieties tested, Stirling Castle set the largest number of fruits under natural pollination, and Carter's Sunrise set most fruit under hand pollination. Farquhar's Bountiful produced the greatest weight of fruit of all varieties tested under hand pollination. "Apparently varieties like Stirling Castle that have quite short styles, so that the stigmatic surface does not protrude beyond the stamens, sets fruit more readily than those which have long styles like Farquhar's Bountiful."—*H. A. Jones.*

1575. WHITE, THOS. H. Mushrooms. Maryland Agric. Exp. Sta. Bull. 232: 67-95. 1919.—Results of experiments are given on (1) variety testing; (2) covering beds with straw; (3) kind of soil for covering or casing the bed; (4) production in vault or shed; (5) horse manure versus cow manure; (6) manure with and without an admixture of loam; (7) manure from mules fed with and without a molasses feed; (8) temperature of beds, also bottom heat versus no bottom heat. It was found that manure from mules fed on molasses feed was not very satisfactory for mushroom production.—*H. A. Jones.*

1576. WINTERS, S. R. The all-around vegetable. Sci. Amer. 125: 182-183. 4 fig. 1921.—The author discusses the sweet potato and its uses.—*Chas. H. Otis.*

HORTICULTURE PRODUCTS

1577. ANONYMOUS. Markets for applewood. Sci. Amer. 124: 507. 1921.

1578. ANONYMOUS. Utilizing tomato waste. Sci. Amer. 125: 161, 171. 2 fig. 1921.

1579. BOODLE, L. A. Ravicon as a commercial term. Kew Bull. 1921: 115-117. 1921.—This consists of notes on species of *Brassica* or *Sinapis*, known as ravicon, seeds of which are the source of an oil used in soap making.—*E. Mead Wilcox.*

1580. DARNELL-SMITH, G. P. Banana fibre. Agric. Gaz. New South Wales 32: 893-894. 1921.—Technical tests of banana fibers showed them to be inferior to hemp, sisal, and New Zealand flax (*Phormium* sp.). Commercial utilization of banana fiber is improbable.—*L. R. Waldron.*

1581. ORB, G. A. Cultivated rubber. Sci. Amer. 125: 166, 173. 5 fig. 1921.—About 80 per cent of the 700,000 tons of rubber produced annually is now cultivated. Plantation rubber is much preferred by the manufacturer because it arrives in better condition than native rubber. Rubber trees are 5 years old before beginning to bear latex. Details of tapping, and gathering and preparing crude rubber are given.—*Chas. H. Otis.*

1582. WOLL, F. W. Cocoanut meal as a feed for dairy cows and other livestock. California Agric. Exp. Sta. Bull. 335. 241-258. 1921.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 902, 1159, 1224, 1236, 1254, 1294, 1390, 1430, 1433, 1470, 1515, 1551, 1890, 1902, 1951, 2005, 2049)

1583. ANONYMOUS. The fruiting of the Ginkgo at Kew. Kew Bull. 1920: 47-48. 1 fig. 1920.

1584. ANONYMOUS. [Rev. of: BALLARD, C. W. The elements of vegetable histology. 14 X 20 cm., xiv + 248 p., 75 fig. John Wesley Sons Inc.: New York.] Jour. Queckett Microsc. Club 14: 238. 1921.

1585. ANDREWS, F. M. Phyllotaxis of *Specularia perfoliata*. Proc. Indiana Acad. Sci. 1920: 149-150. 1921.—Five plants were found that had the $\frac{1}{3}$ leaf arrangement instead of the $\frac{1}{2}$, which seems to be normal for the species.—*F. C. Anderson.*

1586. BOESHORE, IRWIN. The morphological continuity of Scrophulariaceae and Orobanchaceae. Contrib. Bot. Lab. Univ. Pennsylvania 5: 139-177. Pl. 12-16. 1920.—An account

is presented of the general morphology and histology of the root, the comparative morphology and physiology of stem and leaf, a comparative study of the inflorescence and flower parts including the nectary and seed of the following species: *Gerardia purpurea*, *G. aphylla*, *G. flava*, *G. aspera*, *Aphyllon uniflorum* on *Aster corymbosum*, *Epiphegus virginiana*, *Orobanche cruenta*, *O. minor*, *Lathraea japonica*, *Harveya capensis*, *H. coccinea*, and others. The author believes that ample evidence has been adduced to show that direct and distinct continuity can be established from non-parasitic through semi-parasitic Scrophulariaceae to the most degraded parasites of the family and that these again show direct continuity with the still more degraded and condensedly parasitic types of Orobanchaceae, so that the 2 types should be treated in continuous descending series from the highest to the most degraded genera.—John W. Harshberger.

1587. BUCHNOLZ, MARIA. Über die Wasserleitungsbahnen in den interkalaren Wachstumszonen monocotyler Sprosse. [Water conduction in the intercalary growing zone of monocotyledonous shoots.] Flora 114: 119-136. Fig. 1-12. 1920.—The monocotyledons are divided, on the basis of the structure of the vascular bundles in the intercalary growing zone at the base of the internode, into 4 types, characteristic of the Glumiflorae, the Commelinaceae, the Scitamineae, and the Liliaceae. Protoxylem but not metaxylem is found in this zone. In types I and II the protoxylem is soon replaced by a canal of rhizogenous formation. Experiments on the conduction of colored liquids indicate that the bundle canal is an important channel for water movement. As the canal is capable of enlargement it may compensate for the lack of secondary xylem. The living cells do not take part in conduction in the intercalary zone. A series of tables gives the results of a comparative study of the water-conducting areas in different parts of the stem in 15 species of monocotyledons. The area in the intercalary zone is small in comparison with that in the mature parts of the stem.—A. G. Stokey.

1588. BUONOX, P. La théorie de la syncotylie et le cas du *Streptopus amplexifolius* DC. La notion de phylloïde appliquée à l'interprétation du cotylédon des Monocotylédones. [The theory of syncotyly and the case of *Streptopus amplexifolius*. The idea of the phylloïde applied to the interpretation of the cotyledon of the monocotyledons.] Compt. Rend. Acad. Sci. Paris 173: 660-663. 1921.—An application is made of the theory of syncotyly, formulated by Miss Sargent, to the interpretation of the germination of *Streptopus amplexifolius* made by Wettstein.—C. H. Farr.

1589. BUSCALIONI, LUIGI. Il legno crittogramico del fascio vascolare seminale di talune Angiosperme filogenetiche. [Cryptogrammic xylem of the vascular bundles in seeds of some angiosperms in relation to modern phylogenetic theories.] Malpighia 29: 45-80, 113-204. Fig. 1-30. 1920.—The paper reports a study of vascular tissue in the funiculus and integument of species selected from various plant families,—Leguminosae, Solanaceae, Cucurbitaceae, Cupuliferae, Aesculineae, and Papilionaceae. The author dissents from the hypothesis that the gymnosperms and angiosperms originated dichotomously at the same time, but believes that the latter constitute a group which developed later from the gymnosperms. An extensive bibliography is appended.—Edith K. Cash.

1590. BUSCALIONI, L. Sulle radici aeree fasciate di *Carallia integerrima* DC. [The fasciation of aerial roots in *Carallia integerrima*.] Malpighia 29: 81-96. Pl. 1. 1920.—Although this species is a forest plant and the material studied was collected at some distance from the sea coast (in Ceylon), examination of tissues in cross section shows their great similarity to those of the mangrove, a shore-growing plant belonging to the same family (Rhizophoraceae). The genus *Carallia* is thought to be of coastal origin, more or less recently adapted to inland growth.—Edith K. Cash.

1591. FARR, C. H. Dormancy and winter killing of peach buds. Rept. Iowa State Hort. Soc. 55: 99-116. 1920.—The author describes the various stages between pollen mother-cell

and pollen grain in the peach and discusses the range of pollen development within a single stamen, in different stamens of the same flower, in different flowers of the same bud, in different buds of the same twig, in different twigs of the same tree, in different trees of the same variety, and in the same variety in different localities.—*L. H. Pammel.*

1592. HARRIS, J. ARTHUR, EDMUND W. SINNOTT, JOHN Y. PENNYPACKER, and G. B. DURHAM. The interrelationship of the number of the two types of vascular bundles in the transition zone of the axis of *Phaseolus vulgaris*. Amer. Jour. Bot. 8: 425-432. 2 fig. 1921.—In the base of the hypocotyl of trimerous seedlings, intercalary bundles are fewer in plants where primary double bundles are more numerous, and vice versa. In dimerous seedlings, however, there is no correlation in number between these 2 types of bundles. The correlation between total bundle number and number of intercalary bundles is high in both seedling types, and is generally much higher than the correlation between total bundle number and number of primary double bundles. Variation in number of intercalary bundles is therefore an important factor in determining variation in the total number of bundles at the base of the hypocotyl.—*E. W. Sinnott.*

1593. HATFIELD, E. J. Anatomy of the seedling and young plant of *Macrozamia Fraseri*. Ann. Botany 35: 565-584. Pl. 22, 8 fig. 1921.—The anatomy of germinating seedlings and plants with about 20 leaves is described in detail. From the tip downward the following regions may be distinguished: (1) One in which slow growth in length occurs; (2) one in which growth in girth occurs by the divisions of a specialized layer, which adds parenchymatous tissue to pith and cortex as a cambium forms secondary tissues; (3) one in which a collateral vascular cylinder appears; (4) one in which the cambium of the "anomalous" ring is distinguishable and that of the vascular cylinder becomes tangentially extended; (5) one in which irregular transfusion tracheids appear and the complete anomalous ring becomes established; (6) one including the cotyledonary node, which is a region of great complexity and distortion of tissues. Finally (7), the hypocotyledonary region, which is greatly swollen; as a result of its distention the first formed xylem is disrupted and doubled.—The characteristic "girdling" of the leaf traces is due to 2 factors: (1) The absence of internodes and telescoping of the axis causes the traces most remote from the midrib to run nearly horizontally and tangentially; (2) the great activity of the specialized growth layer interpolates a considerable amount of parenchyma between the origin of the leaf trace and its tangential portion.—*W. P. Thompson.*

1594. HOLLEN, H. S., and MARGARET E. DANIELS. Observations on the anatomy of teratological seedlings. IV. Further studies on the anatomy of atypical seedlings of *Impatiens Roylei*, Walp. Ann. Botany 35: 461-492. 97 fig. 1921.—Two main types of abnormal seedlings of *Impatiens Roylei* had previously been described, one obviously syncytious and the other possessing only 1 cotyledon and apparently heterocotylous. For the following reasons it is concluded that the heterocotylous type represents the ultimate phase of a syncytious series showing more and more intimate fusion: (1) In certain undoubtedly syncytous midrib bundles unite and behave in transition in the same way as a single normal midrib; (2) there is a progressively closer fusion of the originally separate axillary buds; (3) heterocotylous seedlings have been found in which the double origin of the bud is apparent; (4) the modifications in the epicotyl are very similar in both types.—When certain vascular strands are eliminated on the symphysis side new ones may be produced or existing ones modified for physiological reasons. In some cases the cotyledons have fused by both margins (amphisyncytialy) so that a cotyledonary tube results.—There is an extended general discussion of the way in which the monocotyledonous condition has been derived from the dicotyledonous one, the various possibilities being carefully weighed. The evidence adduced both by the present and other authors is believed to support the view that the process has been one of unilateral syncytialy.—*W. P. Thompson.*

1595. HOLLOWAY, J. E. Further notes on the prothallus, embryo, and young sporophyte of *Tmesipteris*. Trans. and Proc. New Zealand Inst. 53: 386-422. Pl. 63, 85 fig. 1921.—

The habitat, shape, color, multiplication, and fungal relations of the prothallia are described, together with the structure of the sexual organs. The fertilized egg divides transversely, the lower cell producing the foot which sends haustorial protuberances into the thallus, and the upper producing the 1st shoot. A 2nd shoot apex later appears near the base of the 1st. After some time the young plantlet is detached from the prothallus and 1 or both of the main apices grows up into the air and develops scale leaves at its tip. The 1st aerial shoots are weak and usually die, persisting only after the rhizome system is well developed. The sporophylls are at first solitary but later occur in scattered patches. Notable features in this species are the similarity of prothallus and young plantlet, the superficial character of the reproductive organs, and the fact that the embryo shows only 2 body-organs, foot and shoot, making it the simplest embryo among existing pteridophytes. The author notes the relation of this type of embryo to that involved in the theory of the origin of the pteridophyte sporophyte from an *Anthoceros*-like sporogonium and its resemblance to the asexual generation of the Rhyniaceae. He emphasizes the importance of the Psilotaceae as a group the members of which in their juvenile stages show features that may be regarded as primitive.—Wm. Randolph Taylor.

1596. JUILLET, A., L. GALAVIELLE, et M. ANCELIN. Système sécréteur des organes végétatifs du pyrèthre de Dalmatie (*Pyrethrum cinerariaefolium* Trev.). [The secretory system of the vegetative organs of Dalmatian pyrethrum (*Pyrethrum cinerariaefolium*).] Bull. Sci. Pharm. 28: 449-459. Fig. 11. 1921.—The localization and structure of the secretory apparatus in the vegetative organs of Dalmatian pyrethrum is similar to that in the Compositae. The secretory tissue is near the endodermis; oleo-resinous cavities are present in the protective membrane; certain endodermic cells have secreting functions which are not shown by morphologic differentiation of these cells. Non-differentiated oliferous cells are scattered in the central cylinder and the secretory canals have frequently accidentally become narrow. The abundance of oleo-resin in the peduncles and leaves may eventually lead to the preparation of an insecticide from these organs in the form of an oleo-resin.—H. Engelhardt.

1597. LAKON, GEORG. Uher die "Krypten" der *Coprosma*-Blätter. [The "crypts" of *Coprosma* leaves.] Centralbl. Bakt. II Abt. 53: 1-6. Fig. 1-3. 1921.—A biological description is presented of characteristic "crypts" found in the angles of the leaves of *Coprosma Baueri* formed by the midrib and the lateral veins. The author concludes that these "crypts" are primitive secretive organs and not domatia, as held by Hamilton and Lundstrom, or organs of absorption, as held by Miss Grensill.—Anthony Berg.

1598. MÖBIUS, M. Über die Blüten von *Renanthera Lowii*. [On the flowers of *Renanthera Lowii*.] Ber. Deutsch. Bot. Ges. 38: 20-27. Pl. 1. 1920.—The author gives a detailed description, based upon examination of a flowering specimen of this orchid in the Palm Garden at Frankfurt, of the 2 types of flowers found in each inflorescence. He states the results of his own and earlier experiments involving the pollination of each type of flower with pollen from the other, and discusses the biological significance of the production by this plant of large, yellow, fragrant flowers in the lower portion of the inflorescence, which bears above large numbers of smaller, odorless, red flowers.—R. M. Holman.

1599. PAU, C. El herbario de Planellas. [Planellas's herbarium.] Brotéria Sér. Bot. 19: 97-106. 1921.—This second installment of Senhor Pau's work covers the families Celastraceae to Onagraceae. The scope of the series is completely outlined in the first installment [see Bot. Absts. 10, Entry 2006].—E. B. Chamberlain.

1600. SOUËGES, RENÉ. Embryogénie des Boraginacées. Les premiers termes du développement de l'embryon chez le *Myosotis hispida* Schlecht. [The embryogeny of the Boraginaceae. The first stages in the development of the embryo of *Myosotis hispida*.] Compt. Rend. Acad. Sci. Paris 173: 726-728. Fig. 1-15. 1921.—A new type of embryo development is found in this species. At the 8-celled stage there is differentiated a cell at the apex of the embryo which becomes the mother cell of the vegetative cone of the stem.—C. H. Fairr.

1601. STEIL, W. N. The development of prothallia and antheridia from the sex organs of *Polypodium irioides*. Bull. Torrey Bot. Club 48: 271-277. Pl. 4, fig. 1-4. 1921.—In an old culture of prothallia there were produced many outgrowths from the sterile cells of the antheridia and archegonia, filaments and secondary antheridia arising from the lid and ring cells of the former, and some antheridia even being transformed into prothallia. From the archegonia, filaments and antheridia were produced, but no secondary archegonia; these structures arose from neck and venter cells. The prothallia formed from antheridia were like those from spores, and the secondary antheridia above mentioned produced motile sperm cells. The peculiar behavior of the sex organs in this culture of *Polypodium* seemed to be due to unfavorable conditions of some sort and has never before been reported for pteridophytes.—P. A. Munz.

1602. TOBLER, F. Zur Kenntnis des Milchsäfts von *Manihot Glaziovii* Mull. Arg. [The latex of *Manihot Glaziovii*.] Ber. Deutsch. Bot. Ges. 38: 159-165. Fig. 1-6. 1920.—Previous workers found cell nuclei among the contents of laticiferous vessels, and small isolated latex cells which suggested cambial origin. The author finds an expanded radial union among the laticiferous elements at the nodes, and concludes that laticiferous tissue behaves as a formative tissue. By studying the effect of wounding, he notes a direct transition between cambium and latex cells. The growing points which branch and anastomose occasionally resemble fungal hyphae. This characteristic increases in the wound tissue, and thus arise countless ramifications in all directions, which furnish radial connections. The increase of latex through tapping is due to the newly formed radial connections. Latex cells are found in the region of most active growth. They are in close connection with the path of the assimilation products and may have a nutritive function.—Frances L. Long.

1603. TURRILL, W. B. Amphichromy in heather. Kew Bull. 1920: 221-223. 1920.—The author discusses amphichromy in *Lacuna vulgaris* and related phenomena in flowers.—E. Mead Wilcox.

1604. VAN HOOK, J. M. A tricotyledonous bean. Proc. Indiana Acad. Sci. 1920: 217. Fig. 1. 1921.—A 3rd cotyledon was found between the 2 usual cotyledons of a lima bean.—F. C. Anderson.

1605. WEATHERWAX, PAUL. Anomalies in maize and its relatives—1. Bull. Torrey Bot. Club 48: 253-255. Fig. 1-5. 1921.—A number of anomalies in the tribe Maydeae of the grasses has been observed. One of these is false polyembryony, which has twice been found in maize, —each case showing 2 plumules and 2 primary roots but only 1 cotyledon. In *Coi* 2 entire caryopses were enclosed in 1 fruit and gave the external appearance of 2 plumules and 2 primary roots emerging from 1 seed.—P. A. Munz.

1606. YUNKER, T. G. A curious abnormality in *Cuscuta cuspidata*. Amer. Bot. 27: 48-49. 1921.

1607. ZINN, JACOB. Normal and abnormal germination of grass-fruits. Maine Agric. Exp. Sta. Bull. 294. 197-216. Fig. 33-44. 1920.—Normally the coleorhiza penetrates through the pericarp and lemma by mechanical pressure and produces anchoring trichomes; then the coleorhiza is broken through by the radicle. Abnormality in germination is due to failure of the coleorhiza to penetrate the lemma, and is greatly increased by the conditions of artificial-germinator tests. Polyembryony was observed in *Arrhenatherum elatius*, *Poa pratensis*, *P. nemoralis*, and *P. compressa*.—Donald Folsom.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 1056, 1954, 2042, 2063)

1608. CEDERGREN, GÖSTA R. *Draparnaldia mutabilis* (Roth) nov. comb., non Bory. Bot. Notiser 1920: 159-160. 1920.—The new combination is based on *Conferva mutabilis* Roth, 1797, the original description of which is reprinted. After proving that this species of *Conferva* must be a *Draparnaldia*, the author concludes that the species has the following synonymy: *Batrachospermum plumosum* Vauch., 1803; *Draparnaldia hypnosa* Bory, 1808; *Conferva lubrica* of Eng. Bot. 1809, not Dillw.; *Draparnaldia plumosa* Ag. 1812.—P. A. Rydberg.

1609. CEDERGREN, GÖSTA R. Was ist *Vaucheria cruciata* (Vauch.) DC.? [What is *Vaucheria cruciata*?] Bot. Notiser 1920: 155. 1920.—The author reprints the original description on which the species was based, gives the history and supposed relationship, and comes to the conclusion that the alga is the same as *V. Voroniana* Heer., and that *V. geminata* Götz, in part, is a synonym thereof.—P. A. Rydberg.

1610. COTTON, A. D. The marine algae of the Danish West Indies. [Rev. of: BØRGENSEN, F. The marine algae of the Danish West Indies. 3 vol. 1915-1920.] Kew Bull. 1921: 224. 1921.

1611. CUNNINGHAM, BERT. A pure culture method for diatoms. Jour. Elisha Mitchell Sci. Soc. 36: 123-126. Pl. 9. 1921.—Pure cultures of 4 species of diatoms, as well as several algae, were grown on agar plates containing a nutrient solution. The cultures showed characteristic forms, as in bacteria.—W. C. Coker.

1612. CUNNINGHAM, BERT. The occurrence of unlike ends of the cells of a single filament of *Spirogyra*. Jour. Elisha Mitchell Sci. Soc. 36: 127-128. Pl. 10. 1921.—It is shown that in a single filament may be found partitions which are plane and those which are replicate, a character heretofore supposed to be specific.—W. C. Coker.

1613. HOWE, MARSHALL AVERY. Some plants from tropical sea gardens. Nat. Hist. 20: 560-568. 8 fig. 1920.—The paper includes a popular description of the algae of the tropical and subtropical seas, and discussions of the myth of the "Sargasso Sea," the popular grouping into brown, green, and red, the lime encrusted forms, and the value of some as articles of food.—Albert R. Sweetser.

1614. KOFOID, CHARLES ATWOOD, and OLIVE SWEETSER. The free-living and unarmored Dinoflagellata. Univ. California Publ. Men. Ser. 5: 1-562. Pl. 1-12, 388 fig. 1921.—This monograph includes all known unarmored and free-living Dinoflagellata. It is based on a study of the marine forms of the San Diego region made at the Marine Biological Station of the Scripps Institution for Biological Research. It includes 223 species belonging to 16 genera.—The following genera are new: *Protodinifer*, *Gyrodinium*, *Torodinium*, *Pavillardia*, *Protopsis*, *Nematodinium*, and *Proterothropsis*. One hundred and seventeen species are new, distributed as follows in the genera: *Protodinifer*, 1; *Amphidinium*, 12; *Gymnodinium*, 36; *Gyrodinium*, 23; *Cochlodinium*, 21; *Torodinium*, 1; *Pavillardia*, 1; *Protopsis*, 1; *Nematodinium*, 2; *Pouchetia*, 12; *Proterothropsis*, 1; *Erythropsis*, 6. The Dinoflagellata have evolved from a primitive, biflagellated flagellate, by differentiation of the two primitive, similar, anterior flagella. One becomes ribbon-like, with short undulations, and is the transverse flagellum of the Diniferidae. The other flagellum becomes the longitudinal trailing flagellum by the posterior migration of the flagellar pore to the midventral region. In the Adiniferidae the flagella are differ-

entiated but the pore has not migrated posteriorly. The unarmored forms are more primitive than the armored ones, the Athecatoidae than the Thecatoidae in the Adiniferidae, the Gymnodinioidae than the Peridinioidae in the Diniferidae.—The new genus *Protodinifer* is a primitive form with anterior, differentiated flagella, and partial girdle feebly developed. It shows affinities to the Adiniferidea and suggests the origin of both Adiniferidea and Diniferidae from unarmored, ancestral forms allied to it.—The two flagella, transverse and longitudinal, with the two channels in the surface of the body in which they lie, the girdle and sulcus, are superficial organs in active contact with the environment, and are extensively modified in an orthogenetic manner in the evolution of the genera, and in speciation within the genera.—The modifications consist of a progressive elongation of the girdle, with accompanying torsion of the body in a left spiral up to four turns. There is also a progressive torsion of the sulcus and its prolongation to the apex and antapex, culminating in the genus *Cochlodinium*.—Structural differentiation of the areas bordering the girdle and sulcus, with or without torsion, appear in the pseudopodia of *Gymnodinium zachariasi*, the ephemeral (?) tentacle of *G. pseudonociluca*, the tentacle of *Noctiluca*, the incipient prod of *Proterothropsis*, and the highly developed prod and its enclosing chamber in *Erythropsis*. There is also a tendency for pigment to aggregate in the margins of the girdle, for the stigma to appear in the sulcus, and for the ocellus to lie adjacent to the girdle.—There is an orthogenetic evolution of the ocellus in the genera *Protopsis*, *Pouchetia*, *Proterothropsis*, and *Erythropsis*, by the integration of scattered pigment granules and loosely aggregated lens bodies into a compact melanosome enclosing a red sensory core at the base of concentrically laminated, spherical lens.—Nematocysts are formed in *Polykrikos* and *Nematodinium*. They are derivatives of the centrosome or cell center.—There is an extraordinary range in color of the Gymnodinioidae. The simpler forms are green, yellow, or brown, while the colors of many of the more complex ones are near the red end of the spectrum.—Holozoic nutrition occurs in most of the genera and is almost exclusively prevalent in those of a higher type. The sulcus is the cytosome.—*Noctiluca* belongs in the Gymnodinioidae. It has a sulcus, the so-called atrium and rod organ, a rudimentary girdle, heretofore undetected, and the transverse flagellum is present in a rudimentary condition in the so-called tooth.—The Cystoflagellata, as defined by Haeckel, should be reduced to contain only *Leptodiscus* and *Craspedotella*, pending the analysis of their affinities when their life history shall be discovered.”—New names and combinations are proposed as follows, in each case referring to new species unless otherwise indicated: *Protodiniferidae* fam. nov., *Protodinifer* gen. nov., *P. tentaculatum*, *P. marinum* comb. nov., *Rotundinium* subgen. nov., *Amphidinium* subgen. nov., *A. asymmetricum*, *A. corpulentum*, *A. cucurbita*, *A. cucurbitella*, *A. dentatum*, *A. fastigium*, *A. galbanum*, *A. herdmani* nom. nov., *A. klebsi* nom. sp. nov., *A. pacificum*, *A. saissum*, *A. truncatum*, *A. turbo*, *A. vasculum*, *Gymnodinium* subgen. nov., *Lineodium* subgen. nov., *Pachydinium* subgen. nov., *Gymnodinium abbreviatum*, *G. adriaticum* comb. nov., *G. agile*, *G. amphora*, *G. attenuatum*, *G. auratum*, *G. aureum*, *G. bicorne*, *G. bifurcatum*, *G. canus*, *G. cinctum*, *G. conicum* nom. nov., *G. contractum*, *G. costatum*, *G. dissimile*, *G. dogielii*, *G. doma*, *G. flarum*, *G. fulgens* nom. nov., *G. grammaticum* comb. nov., *G. hamulus*, *G. herbaceum* Kofoid MSS., *G. heterostriatum* nom. nov., *G. incisum*, *G. lineatum*, *G. lineopunicum*, *G. lira*, *G. multilinatum*, *G. multistriatum*, *G. ovulum*, *G. pachydermatum*, *G. puniceum*, *G. radiatum*, *G. ravenesceens*, *G. rubricauda*, *G. rubrum*, *G. scopolosum*, *G. simplex* comb. nov., *G. situla*, *G. sulcatum*, *G. translucens*, *G. uberrimum* comb. nov., *G. violaceens*, *Gyrodinium* nom. gen. nov., *Gyrodinium* subgen. nov., *Laevigella* subgen. nov., *Gyrodinium acutum* comb. nov., *G. biconicum*, *G. britannia* nom. nov., *G. capsulatum*, *G. caudatum*, *G. concentricum* comb. nov., *G. contortum* comb. nov., *G. corallinum*, *G. cornutum* comb. nov., *G. crassum* comb. nov., *G. culeus*, *G. cuneatum* nom. nov., *G. dorsum*, *G. falcatum* nom. nov., *G. fissum* comb. nov., *G. fluorescens*, *G. falvidum*, *G. foliacum* nom. nov., *G. fucorum* comb. nov., *G. fulvum*, *G. fusiforme* nom. nov., *G. glaucum* comb. nov., *G. grave* comb. nov., *G. herbaceum*, *G. hyalinum* comb. nov., *G. intartum*, *G. lachryma* comb. nov., *G. longum* comb. nov., *G. maculatum*, *G. melo*, *G. mitra* nom. nov., *G. obtusum* comb. nov., *G. ochraceum*, *G. ovalum* comb. nov., *G. aviculum*, *G. ornatum* comb. nov., *G. parrulum* comb. nov., *G. pepo* comb. nov., *G. pingue* comb. nov., *G. postmaculatum*, *G. pusillum* comb. nov., *G. rubricaudatum*, *G. schuetti* comb. nov., *G. spirale* comb. nov., *G. spumantia*, *G. submarinum*,

G. trunatum, *G. truncus*, *G. virgatum*, *G. viridescens*, *Cochlodinium* subgen. nov., *Glyphodinium* subgen. nov., *Polydinum* subgen. nov., *Cochlodinium atramaculatum*, *C. augustum*, *C. cavatum*, *C. cereum*, *C. citron*, *C. clarissimum*, *C. conspiratum*, *C. convolutum*, *C. distortum*, *C. elongatum*, *C. faurei*, *C. lebourae*, *C. miniatum*, *C. radiatum*, *C. rosaceum*, *C. schuetii*, *C. scintillans*, *C. turbineum*, *C. vinectum*, *C. virescens*, *C. volutum*, *Torodinium* gen. nov., *T. robustum*, *T. teredo* comb. nov., *Polykrikidae* fam. nov., *Pavillardia* gen. nov., *P. tentaculifera*, *Noctiluca scintillans* comb. nov., *Pouchetidae* fam. nov., *Protopsis* gen. nov., *P. neapolitana* Kofoid MSS., *P. nigra* comb. nov., *P. ochrea* comb. nov., *Nematodinium* gen. nov., *N. armatum* comb. nov., *N. partitum*, *N. torpedo*, *Pouchetia* subgen. nov., *Pouchetiella* subgen. nov., *Pouchetia alba*, *P. alra*, *P. maculata*, *P. maxima*, *P. polyphemus* comb. nov., *P. poucheti*, *P. purpurata*, *P. purpureescens*, *P. rosea* comb. nov., *P. rubescens*, *P. schuetii* nom. nov., *P. striata*, *P. subnigra*, *P. violescens*, *P. vorax*, *Proterothropsis* gen. nov., *P. crassicaudata*, *Polysidella* subgen. nov., *Erythropsis cochlea* comb. nov., *E. cornuta* comb. nov., *E. extrudens*, *E. hispida*, *E. labrum*, *E. minor*, *E. pavillardi* nom. nov., *P. richardi*, *E. scarlatina*.—W. A. Setchell.

1615. KUFFERATH, H. Essais de culture des algues monocellulaires des eaux saumâtres. [Culture tests of unicellular algae of brackish waters.] Ann. Biol. Lacustre 9: 1-11. 1919.—Certain of the marine Chlorophyceae may be cultivated by growing them on sea-water gelose, and then transferring the isolated colonies to sterile sea water. The sea water may be improved by the addition of solutions of nitrates and phosphates. This method of isolating algae on gelose may be used in studying the occurrence of green algae in the sea and brackish waters.—Henri Micheels.

1616. KUFFERATH, H. Note sur la forme des colonies des Diatomées et autres algues cultivées sur milieu nutritif minéral gélosé. [Note on the form of colonies of diatoms and other algae cultivated on a nutritive salt gelose medium.] Ann. Biol. Lacustre 9: 12-24. 1919.—The form of the algae determines the form of the colonies in artificial cultures.—Henri Micheels.

1617. MAZZA, ANGELO. Aggiunte al saggio di algologia oceanica. [Appendix to the essay on oceanic algology.] Nuova Notarizia 32: 1-48, 73-132. 1921.—The present is a continuation of the author's systematic and morphological studies of the Florideae of the world. The species particularly described or discussed are *Acanthococcus spinuliger*, *Erythroclonium Muelleri*, *Wurdemannia stacea*, *Stenoeladia Cliftoni*, *Gelidiopsis intricata*, *G. pannosa*, *Curdia Racovitzae Hariot* n. sp., *Gracilaria lichenoides*, *G. armata*, *G. dura*, *G. Henriquesiana* Hariot n. sp., *G. divergens*, *Hypnea divaricata*, *H. cornicornis*, *H. pannosa*, *Fauchia repens*, *F. microspora*, *F. laciniata*, *F. Fryeana*, *Gloioderma tasmanicum*, *Rhodymenia palmata mollis*, *Epymenia obtusa*, *Erythrymenia obvovata* Schmitz n. gen. and sp., *Sebdenia ceylanica*, *Lomentaria ovalis subarticulata*, *Plocamium violaceum*, *P. secundatum*, *P. Mertensii*, *P. procerum*, and *Halosaccion glandiforme*.—Marshall A. Howe.

1618. NAUMANN, EINAR. Über den "Acaroides" Typus einiger Diatomeen des sternförmigen Bautypus. [On the "acaroides" type of some diatoms of the stellate type of structure.] Ber. Deutsch. Bot. Ges. 37: 79-82. Fig. 1-3. 1919.—The author, at the same time and locality, collected material containing large quantities of *Diatoma elongatum* by means of the plankton net and by taking samples of the water. The material was preserved in the customary way with formalin. After 2 years the collections were examined. It was then found that in the samples secured with the net the diatoms named above were of the normal form while those in the water samples were of the "acaroides" type, the separate cells of the colonies being bent as in Lemmermann's *Asterionella formosa* var. *acaroides*. The author concludes that the "acaroides" form of *Diatoma elongatum* is an artifact and represents an early stage in the collapse of the cell. He suggests that in the water samples conditions more favorable to the disorganization of the cells existed than in the samples taken with the net. The author believes it likely that Lemmermann's "acaroides" type of *Asterionella formosa* was also an artifact.—R. M. Holman.

1619. RANTIERI, R. *Corallinaceae del litorale tripolitano.* [Corallinaceae of the coast of Tripoli.] *Nuova Notarisia* 32: 133-149. *Fig. 1-7.* 1921.—The paper consists of critical notes on 12 species of Corallinaceae and 1 of Squamariaceae collected on the coast of Tripoli by C. F. Parona in 1912-13, most of them here for the 1st time recorded for Tripoli. The author includes text figures illustrating microscopic characters of 5 of the species.—*Marshall A. Howe.*

1620. SCHMID, GÜNTHER. *Ein Hilfsmittel zum Unterscheiden verschiedener Oscillatoria- und Phormidiumarten.* [An aid in distinguishing various species of Oscillatoria and Phormidium.] *Ber. Deutsch. Bot. Ges.* 37: 473-476. 1919.—The author states that the direction of the rotation about the axis of the filament in various species of the 2 genera named is constant for any species but is toward the right in some species and toward the left in others. He suggests that this fact can often be used to distinguish species otherwise very difficult to recognize. The direction of rotation is itself somewhat difficult to observe with the microscope, but the author has found that when the material is placed on the moist surface of gelatin or agar plates (1 per cent agar-agar is recommended) the tracks left by the creeping filaments are clearly visible when the surface is inclined to the proper angle with the light and to be curved in their course either to the right or to the left according to the direction of rotation of the filaments about their axes. Examples are given of species which are very similar and which may be distinguished by macroscopic examination of the course of the filaments.—*R. M. Holman.*

1621. STRAND, E. [German rev. of: STEINER, G. *Untersuchungsverfahren und Hilfsmittel zur Erforschung der Lebewelt der Gewässer.* (Methods and apparatus for use in the investigation of water-inhabiting organisms.) 148 p., 2 pl., 150 fig. Stuttgart, 1919.] *Arch. Naturgesch. Abt A.* 86: 147, 148. 1920 [1921].

1622. TAYLOR, WM. RANDOLPH. A method of demonstrating the sheath structure of a desmid. *Trans. Amer. Microsc. Soc.* 40: 94-95. 1 fig. 1921.—"Fresh living material is placed in a 0.05 per cent aqueous solution of methylene blue for 45 to 60 seconds. It is then removed, rinsed in distilled water, and placed in a $\frac{1}{10}$ saturated solution of picric acid. This serves to fix the stain and bring out in a most striking manner the striations in the sheath. The material may be examined in the picric acid solution, or removed after a minute or two to water. Preparations are best used soon after staining, as the sheath begins to disintegrate after a few hours."—*S. H. Essary.*

1623. TIFFANY, L. H. New forms of *Oedogonium*. *Ohio Jour. Sci.* 21: 272-275. *Pl. 1.* 1921.—*Oedogonium exocostatum* n. sp., distinguished by being macrandrous, by having 13-15 ribs on the outer oospore wall, by swollen sufflatory cells, and by its dimensions, and *O. paucocostatum* var. *gracilis* n. var., with largely ellipsoid oospores, are described.—*H. D. Hooker, Jr.*

1624. TONI, [G. B.] DE, [A.] FORTI, and [M. A.] HOWE. A new species of *Laurencia* from Chile described by de Toni, Forti, and Howe: *Laurencia chilensis* sp. nov. *Nuova Notarisia* 32: 150-153. *Fig. 1-3.* 1921.—The paper includes descriptions in English and Latin and 3 figures of the new species named in the title, the original diagnosis supplied by the last-named author.—*Marshall A. Howe.*

1625. WILLIAMS, J. LLOYD. The gametophytes and fertilization of *Laminaria* and *Corda*. (Preliminary account.) *Ann. Botany* 35: 603-608. 1921.—The author has proved that the small brown algae which always occur in cultures of germinating spores along with the cells or cell-chains which give rise to *Laminaria* plants are male gametophytes with their antheridia. He has observed the liberation of the antherozoids and the actual fertilization. The latter process takes place after the single egg has emerged from the oogonium. There is thus a pronounced alternation of generations with much reduced gametophytes. The systematic position of the group has to be changed. The necessity no longer exists of regarding the algae with the highest histological differentiation as having only asexual reproduction.—*W. P. Thompson.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

A. W. EVANS, *Editor*

(See also in this issue Entries 1056, 1069)

1626. ANDREWS, A. LEROY. Notes on North American Sphagnum, IX. *Bryologist* 24: 81-86. 1921.—The author continues the discussion of the group *Cuspidata* from the 8th number of the series [see Bot. Absts. 3, Entry 2467], considering the specific relationships, diagnostic characters, and distribution of 3 species of the group. He concludes that *S. Fitzgeraldi* Ren. (including *S. Mohrianum* Warnst.), while close to the serrulate forms of *S. cuspidatum*, should not be relegated to synonymy without much more careful field study; that *S. Dusenii* Jens. is a well-founded species; and that *S. mendocinum* S. & L., an endemic species of the Pacific coast area, is unquestionably distinct and probably not a direct derivative of any existing species. He notes also the first specimens of *S. obtusum* Warnst. he has seen from the American continent and records the occurrence of *S. recurvum* Beauv. in Panama.—E. B. Chamberlain.

1627. CHAMBERLAIN, E. B. A correction. *Bryologist* 24: 80. 1921.—The author notes an error in writing "linear millimeter" for "square millimeter" in reviewing a recent contribution of Amann upon Swiss mosses [see Bot. Absts. 11, Entry 461].—E. B. Chamberlain.

1628. CULMANN, P. Sur quelques mousses d'Auvergne à péristome imparfait. [On certain mosses of the Auvergne with imperfect peristomes.] *Rev. Bryologique* 48: 17-22. 1921.—The author brings out the fact that the peristome is often poorly developed in certain mosses of the Auvergne region of central France and attributes this phenomenon to the volcanic nature of the rocks and their exposure to strong sunlight. Among the forms with rudimentary peristomes he devotes particular attention to *Tortula obtusifolia* Schleich. var. *pilifera* Culmann (proposed as new) and *Grimmia plagiopodia* Hedw. var. *arvernica* (Philib.) Boulay. In connection with the *Tortula* he discusses the North American *Desmatodon arenaceus* Sulliv. & Lesq., which has sometimes been regarded as a synonym, expressing the opinion that it is amply distinct and proposing for it the new combination *Tortula arenacea* (Sulliv. & Lesq.) Culmann.—A. W. Evans.

1629. DISMIER, G. Note sur quatre numéros d'exsiccata. [Note on four numbers in exsiccata.] *Rev. Bryologique* 48: 28-29. 1921.—The author corrects 3 determinations in the *Musci Galliae* of Husnot and 1 in the *Musci europaci* of Bauer.—A. W. Evans.

1630. DISMIER, G. Une mousse nouvelle pour la France à Joinville-le-Pont (Seine): *Fissidens Arnoldi* Ruthe. [A moss new to France at Joinville-le-Pont (Seine): *Fissidens Arnoldi* Ruthe.] *Bull. Soc. Bot. France* 65: 11-12. 1918.—The author reports the discovery of the rare *Fissidens Arnoldi* on the banks of the Marne at Joinville-le-Pont in the department of the Seine, France, and discusses its distinctive features, comparing it with the more abundant *F. crassipes* Wils. Since its original discovery in Bavaria *F. Arnoldi* has been found in various other parts of Germany and also in Hungary, Bohemia, and Switzerland, but had not been recorded from France.—A. W. Evans.

1631. DUPLER, A. W. The air chambers of *Reboulia hemisphaerica*. *Bull. Torrey Bot. Club* 48: 241-252. 22 fig. 1921.—The *Reboulia* type of air chamber in the Marchantiaceae has been mostly studied in genera other than *Reboulia*. In this genus the very long chambers of the thallus extend lengthwise along the midrib region and from this radiate pinnately toward the margins of the thallus. In the midrib region are found several layers of superimposed chambers consisting essentially of a single series. Primary chambers are partially subdivided by plates of cells. In both thallus and receptacles, chambers arise schizogenously, splits occurring both internally and superficially. Later development is due largely to growth of tissues.—P. A. Munz.

1632. EMIG, W. H. [Rev. of: POTTIER, JACQUES. *Recherches sur le développement de la feuille des mousses.* (Studies on the development of the leaf in mosses.) *vii + 144 p., 32 pl.* Chartres, 1920 (see Bot. Absts. 9, Entry 879).] *Bryologist* 24: 78-80. 1921.—The reviewer criticises the omission of American and English titles from the bibliography, the lack of sufficient explanation of the illustrations, and the lack of uniformity in the execution of the figures themselves. He maintains that the author is in error in stating that Morren in 1840 was the first to describe the development of moss leaves, Robert Brown having done so in 1819; he also maintains that the author's diagram and account of the development of the leaf in *Mnium undulatum* is entirely at variance with the cross sections figured, and that the development actually parallels that described for *Mn. punctatum*, the development of which is outlined in the review.—E. B. Chamberlain.

1633. FLEISCHER, M. [Rev. of: SCHELLENBERG, G. *Über die Verteilung der Geschlechtsorgane bei den Bryophyten.* (On the disposition of the sexual organs in the bryophytes.) Beih. Bot. Centralbl. 37: 115-153, 3 fig. 1920 (see Bot. Absts. 11, Entries 1639, 1640). *Hedwigia* 62 (Beihlatt): 31-33. 1920.—The reviewer criticises the following statements of the author: That dwarf male plants sometimes arise on female chlorenchyma, maintaining that this has not yet been proved; that all bryophytes are homophytic; that the determination of sex at the reduction division has been definitely established in dioicous bryophytes.—A. W. Evans.

1634. GYÖRFFY, I. *Bryologische Seltenheiten.* XIII. [Bryological rarities.] *Hedwigia* 73: 48-49, 3 fig. 1921.—The author describes and figures a capsule of *Bryum pallescens* with a single apophysis and 3 spore-cases, each with a well-formed operculum. He applies the term Trachelosyncarpic to monstrosities of this type.—A. W. Evans.

1635. HERZOG, TH. *Die Lebermoose der 2 Freiburger Molukkenexpeditionen und einige neue Arten der engeren Indomalaya.* [The liverworts of the 2 Freiburg expeditions to the Molucca Islands and some new species of the Indomalayan region.] Beih. Bot. Centralbl. 38: 318-332, 11 fig. 1921.—The true mosses of the Moluccan expeditions have already been treated by the author [see Bot. Absts. 8, Entry 1261]. The expeditions were made in 1910-12 for the exploration of the 2 islands Ceram and Buru under the leadership of K. Deninger, who was later killed in the war. E. Stresemann as zoologist did most of the botanical collecting. The other Indomalayan specimens included are of miscellaneous origin, 2 of them having been collected by the author himself in Ceylon in 1906. The species listed number 22, of which the following are new: *Colura brevistyla*, *Lepidozia plumula*, *Lophocolea Deningeri*, *Madolheca crenilobula*, *Mastigobryum Deningeri*, *M. nigricans*, *M. Stresemannii*, *Plagiochila vesiculosula*, *Schisma divaricatum*. The author, who had not previously done original work on hepaticas, had access to the drawings of Stepani, prepared to illustrate his Species Hepaticarum.—A. L. Andrews.

1636. HERZOG, TH. *Mitteilungen über neue und wenig bekannte Formen von Brutorganen bei Laubmoosen.* [Observations on new and little known organs of vegetative reproduction in mosses.] *Flora* 113: 337-358, 6 fig. 1920.—The author describes the organs of vegetative reproduction in 5 mosses. In the 1st, *Streptopogon heterophyllus* Herzog, of Bolivia, they are in the form of filiform gemmae (Brutfäden) and are borne on the margins of leaves, some of which are strikingly modified. In the 2nd, *Leptodontium proliferum* Herzog, likewise of Bolivia, they are in the form of small oval gemmae (Brutkörper) and are produced in masses on the tips of the perichaetal bracts and adjacent leaves. In the 3rd, *Pottia propagulifera* Herzog, of Sardinia, the organs are again associated with the perichaetal bracts but are irregular masses of cells, which give rise directly to moss-buds without first forming a chloronema, as is usual in such cases. In the 4th, *Tortula serripungens* var. *exesa* C. Müll., of Argentina and Bolivia, some of the leaves form irregular marginal outgrowths or lobes (Brutlappen), which easily become detached and clearly represent organs of vegetative reproduction. In the last species, *Bartramia polytrichoides* C. Müll., of the Andean region, the organs are in

the form of fusiform swellings and are borne at the tips of excurrent midribs. As the author states, the filiform gemmae of the 1st species, the caducous leaf-lobes of the 4th, and the fusiform bodies of the 5th represent new types of vegetative organs of reproduction. He likewise emphasizes the close association of gemmae and archegonia in the *Leptodontium* and the *Potia*, pointing out that this tends to disprove the supposed antagonism between sexual and vegetative reproduction.—A. W. Evans.

1637. JØRGENSEN, E. Notiser til Norges levermosflora-I. [Notes on the liverwort flora of Norway-I.] Bergens Mus. Aach. 1919-20⁷: 1-6. 1920.—The author gives critical notes on the following species of hepaticas: *Cephalozia papillosa* (Douin) Schiffn., *Microlejeunea ulicina* (Tayl.) Evans, and *Triloma scitula* (Tayl.) Jørgensen, the last being a new combination based on *Jungermannia scitula* Tayl. The discovery of the *Microlejeunea* in Norway makes it possible to supplant an old and doubtful record for the species by a thoroughly trustworthy record. The other 2 species represent additions to the Norwegian flora.—A. W. Evans.

1638. PEARSON, Wm. Hr. Ricciocarpus natans (L.) Corda, from Africa. Bryologist 24: 69-70. 1921.—This species, previously unknown from Africa, has been found at Misie in the Belgian Congo by Vanderyst and at Port Natal by Krause. The Congo specimen represents the var. *terrestris*, and the author notes a few details regarding the capsules and spores of this variety.—E. B. Chamberlain.

1639. SCHELLENBERG, G. Über die Verteilung der Geschlechtsorgane bei den Bryophyten. [The disposition of the sexual organs in the hryophytes.] Beih. Bot. Centralbl. 37¹: 115-153. 1920.—The very diverse arrangements of antheridia and archegonia as found in the hryophytes are discussed in great detail. The historical development of bryological theory upon the subject is fully considered and criticized in the light of present knowledge. The author strives to distinguish more sharply the categories, particularly from the point of view of plant evolution. With reference to the production of antheridia and archegonia he divides the bryophytes into the heterothallic and homothallic forms. The heterothallic bryophytes may be isosporous or heterosporous. The homothallic may be pseudoheterothallic, homoicous, or polyicous. The pseudoheterothallic may be rhizautoicous, eupseudoheterothallic, or pseudautoicous. The most primitive type he regards as the rhizautoicous, the others developing from it in 2 lines. The homoicous includes the commonly distinguished autoicous, paroicous, and synoicous, which the author considers of a very subordinate grade of distinction, though he also discusses at length their interrelation. In conclusion are given the results of a series of experiments interpreted as confirming in one direction the author's theory that in homoicous mosses it is conditions of better nourishment that are favorable to the production of archegonia. The experiments reported upon were limited to *Funaria hygrometrica* and tend to show that this species does not produce archegonia until antheridia are present. Amputations led to the production of antheridia on secondary shoots that would normally have been expected to produce archegonia. Plants not so amputated produced under the same conditions normal archegonia. Plants exposed to a minimum of light or to light of a single color and so having all the evidence of undernourishment did not branch and produced only antheridia.—A. L. Andrews.

1640. SCHELLENBERG, GUSTAV. Über die Verteilung der Geschlechtsorgane bei den Bryophyten. [Disposition of sexual organs in hryophytes.] 8 vo., 39 p. Hab.-Schr., Kiel, 1920. [See preceding entry.]

1641. THÉRIOT, I. Considérations sur la flore hryologique de la Nouvelle-Calédonie et diagnoses d'espèces nouvelles. [Remarks on the hryological flora of New Caledonia and diagnoses of new species.] Rev. Bryologique 48: 22-28. 1921.—Two preceding parts of this paper on the moss flora of New Caledonia have already been abstracted [see Bot. Absts. 19, Entries 611, 1846]. In the present part 14 species are discussed with critical notes and full data regarding localities. As a monotypic new genus *Bryobrothera* is proposed, based on

Mesochaete (?) crenulata Broth. & Par., an endemic species. In addition the following new species are described: *Bryum Franci*, *B. neocaledonicum*, *B. signatellum*, *B. taoense*, and *Myurium quinquefarium*. Four new varieties and the following new combination are likewise proposed: *Myurium purpuratum* (Mitt.) Thér., based on *Oedidodium purpuratum* Mitt.—A. W. Evans.

1642. WARNSTORF, C. Die Unterfamilie der Scapanioideen (Spruce 1885). [The subfamily Scapanioideae.] *Hedwigia* 73: 55-116. 1921.—In a short introduction the author gives the characteristics of the subfamily Scapanioideae and of the various genera included under it. He then describes or discusses critically 80 species of *Scapania* from various parts of the world, his observations being based largely on specimens in the Botanical Museum at Berlin-Dahlem, where the important collection of Gottsche is preserved. The following species are proposed as new, Warnstorf being the authority for the names except where otherwise indicated: *S. amurensis* (Amur), *S. austini* (North America), *S. Berggrenii* (Spitzbergen), *S. brasiliensis* (Brazil), *S. denticulata* (Madeira), *S. Flotowiana* (probably Germany), *S. gracillima* (Amur), *S. integriloba* (eastern Asia), *S. Jackii* (Baden), *S. japonica* Gottsche (Japan), *S. Limprichtii* (Silesia), *S. microphylla* (Greenland), *S. minuta* (Italy), *S. parvifolia* (Siberia), *S. paucidentata* (Bohemia), *S. perlaza* (California), *S. perminko* (Sweden), *S. recurvifolia* (North America), *S. reniformis* (France), *S. rotundata* (Siberia), *S. rufidula* (Siberia), *S. socia* (Tirol), *S. spathulifolia* Steph. (Philippine Islands), *S. spiniformis* (Amur), *S. subaequifolia* (Siberia), *S. subrotundifolia* (Amur) and *S. suaveola* (Sweden). New varieties are likewise proposed under the following species: *S. aspera* Bernet, *S. Bartlingii* Hampe, *S. nemorosa* (L.) Dum., *S. parviflora* Steph., *S. portoricensis* Hampe & Gottsche, *S. rufidula*, *S. subaequifolia*, and *S. undulata* (L.) Dum. In addition to these the following nomenclatorial changes may be noted: *S. irrigua* var. *alpina* Bryhn (of Norway) is raised to specific rank under the name *S. alpina* (Bryhn) Warnst.; *S. cuneifolia* Steph. (Samea) is reduced to varietal rank under *S. verrucifera* Massal.; *S. heterophylla* Howe (of California) is reduced to varietal rank under *S. undulata*; the manuscript name *S. indica* Gottsche is substituted for *S. Griffithii* Schiffn. (of the Himalayas); *S. paludicola* var. *Kaalaasi* K. Müll. (of Scandinavia) is raised to specific rank under the name *S. Kaalaasi* K. Müll.; and the new name *S. nipponensis* Warnst. is substituted for *S. spathulifolia* Warnst. (of Japan), on account of an older *S. spathulifolia* Steph.—A. W. Evans.

1643. WILLIAMS, R. S. Mosses from British Guiana and Dominica, Lesser Antilles, collected by Miss E. F. Noel in 1914. *Bryologist* 24: 65-67. Pl. 4. 1921.—The article enumerates 11 species of mosses from Kaieteur Falls, British Guiana, and 18 from Dominica. *Macromitrium trinitense*, known only from Kaieteur Falls and from Trinidad, is described and figured as new.—E. B. Chamberlain.

1644. WILLIAMS, R. S. Mosses of the Canadian Arctic Expedition, 1913-1918. Rept. Canadian Arctic Expedition (Botany) 4: 1E-14E. 1 pl. 1921.—The paper gives a report on 68 species of mosses collected along and near the arctic coasts of Alaska, Yukon, and the Northwest Territories, as far eastward as 110°W. longitude. The majority of the specimens were found by F. Johansen, and full details regarding localities and dates are given under each species. The genera most largely represented are *Drepanocladus* with 11 species and *Bryum* with 9, most of the remaining genera (32 in number) being represented by only 1 or 2 species each. Two species, *Barbula Johansenii* and *Chrysophyllum arcticum*, are proposed as new and figured, while a third species, *Bryum neodamense* Itzig., is recorded for the 1st time from North America.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND
MYXOMYCETESH. M. FITZPATRICK, *Editor*

(See also in this issue Entries 1029, 1056, 1068, 1077, 1292, 1380, 1575, 1614, 1894, 1911, 1932, 1938, 1944, 1952, 1953, 1956, 1957, 1959, 1960, 1979, 2042 and those in Section Pathology)

FUNGI

1645. ANONYMOUS. *Enumeratio fungorum novorum qui in provincia Antverpiensi a R. Naveau et F. Poelmann reperti sunt; inter quos habentur 63 species et varietates quarum mentio hucusque in flora belgica nondum facta est.* [Enumeration of new fungi collected in the province of Antwerp by R. Naveau and F. Poelmann; among which there are 63 species and varieties not before reported in the flora of Belgium.] *Bull. Cercle Sci. Anvers* (*Tijdschr. Wetenschapp. Kring Antwerpen*) 2: 53-59. 1920.—A list of several hundred species, most of which are members of the higher basidiomycetes, especially of the Agaricaceae.—*H. M. Fitzpatrick.*

1646. ANONYMOUS. *Fungi on frozen meat.* *Sci. Amer.* 125-A: 57. (November) 1921.—A synopsis is presented of Special Report No. 6 of the Food Investigation Board of Great Britain.—*Chas. H. Otis.*

1647. ANONYMOUS. *Hidot, ein zum Patent angemeldetes Fliegenvertilgungsmittel.* [Hidot, a fly-killer: patent applied for.] *Pharm. Zentralhalle* 62: 83. 1921.—P. Altmeyer in Zeitz has succeeded in obtaining *Empusa muscae* in a rather pure condition by cultivating it on a special medium. The fungus in culture is mixed with indifferent substances and can be kept active for a long time. It is a well known parasite of flies.—*H. Engelhardt.*

1648. BOSE, S. R. *Polyporaceae of Bengal. Part IV.* *Carmichael Med. Coll. Belgachia Bull.* 2, 6 p., 15 fig. 1921.—Detailed descriptions with plates are presented of 15 polypores collected at different places in Bengal.—*S. R. Bose.*

1649. BRERLEY, W. B. *The actinomycetes.* [Rev. of: LIESKE, RUDOLPH. *Morphologie und Biologie der Strahlenpilze. (Actinomyceten.)* (Morphology and biology of the ray fungi. [Actinomycetes.]) ix + 292 p., 4 pl. Gebrüder Borntraeger: Leipzig, 1921.] *Nature* 108: 397. 1921.—The work is considered a valuable addition but has several defects in illustrations, treatment of morphology, and treatment of relation to higher plants.—*O. A. Stevens.*

1650. BROOKS, F. T., and G. O. SEARLE. *An investigation of some tomato diseases.* *Trans. British Mycol. Soc.* 7: 173-197. 1921.—Cultural as well as macroscopic and microscopic studies showed that the British form of tomato fruit rot caused by *Phoma destructiva* is identical with that from America, but that the stem "canker" and fruit rot formerly thought to be the same as the American disease caused by *Mycosphaerella citrullina* is in reality due to *Diplodina Lycopersici*. *Phoma alternariaceum*, which was found only once as the cause of a tomato rot, is described as new. The authors emphasize the point that the species of *Phoma* and *Diplodina* are so closely related as to make identification extremely difficult and that systematic cultural studies in these groups are much needed.—*W. B. McDougall.*

1651. COLLETT, R. LESLIE. *Longevity of spores of a fungus in a museum specimen.* *Trans. British Mycol. Soc.* 7: 217-218. 1921.—The author succeeded in germinating spores of *Fumago vagans* Pers. from a specimen kept in the British Museum 67 years.—*W. B. McDougall.*

1652. COULTER, J. M. *Biology of Fomes.* [Rev. of: WHITE, J. H. *On the biology of Fomes applanatus* (Pers.) Wallr. *Trans. Roy. Canadian Inst.* 12: 133-174. 6 pl. 1919 (see Bot. Absts. 8, Entry 521).] *Bot. Gaz.* 69: 359. 1920.

1653. COUPIN, HENRI. *Fungi (champignons)*. Album Gén. Cryptogames Fasc. 23. Pl. 135-143; Fasc. 24. Pl. 143-150; Fasc. 25. Pl. 151-158; Fasc. 26. Pl. 159-165; Fasc. 27. Pl. 166-173; Fasc. 28. Pl. 174-181. 1921.—The 6 fascicles here enumerated are concerned with genera of the following groups: Fasc. 23, Aspergillaceae, Thielaviaceae, Trichophytaceae; Fasc. 24, Trichophytoneae, Hemiascineae, Sacccharomycetaceae; Fasc. 25, Sacccharomycetaceae, Endomycetaceae, Protodiscinae; Fasc. 26, Perisporiales, Hypocreales; Fasc. 27, Hypocreales, Dothideales; Fasc. 28, Sphaeriales.—H. M. Fitzpatrick.

1654. CUNNINGHAM, G. H. *The genus Cordyceps in New Zealand*. Trans. and Proc. New Zealand Inst. 53: 372-382. Pl. 59-62, fig. 1-8. 1921.—The general biology and distribution of the genus is discussed. The following species are described in structure, habit, and distribution: *Cordyceps Sinclairii* Berk., *C. Craigii* Lloyd, *C. consumpta* n. sp., *C. Robertsii* Hook., *C. aemonaes* Lloyd. As of doubtful occurrence there are listed *C. gracilis* Grev. and *C. Gunnii* Berk.—Wm. Randolph Taylor.

1655. DASTUR, JEHANGIR FARDUNJI. *Glomerella cingulata* (Stoneman) Spauld. & v. Schr. and its conidial forms, *Gloeosporium piperatum* E. and E. and *Colletotrichum nigrum* E. and Hals., on chillies and *Carica papaya*. Ann. Appl. Biol. 6: 245-268. 1920.—*Gloeosporium piperatum* E. & E. and *Colletotrichum nigrum* E. & Hals. occurring on chillies in India and Burma were studied as to morphological and cultural characteristics and are considered to be identical and to be the conidial form of *Glomerella cingulata* (Stoneman) Spauld. and v. Schr. The perithecia-producing faculty is lost by cultivating successive generations on the same medium and can not be restored by a change of nutrient medium. The production of conidia, however, can be induced by sudden changes in medium or temperature. Cultural characteristics are not considered reliable for the determination of species. The fungus is described and illustrated. *Colletotrichum* and *Gloeosporium* are considered the same. A new disease of *Carica papaya*, caused by a conidial form of *Glomerella* identical with the one on chillies, is described.—J. G. Leach.

1656. DIEMER, M. E., and ELOISE GERRY. *Stains for the mycelium of molds and other fungi*. Science 54: 629-630. 1921.—To detect mycelium in woody tissues, advantage was taken of the oxidizing or reducing powers of the fungus mycelium. Silver nitrate solution stains the mycelium brown or orange and the wood lighter brown, so that the hyphae are easily seen.—C. J. Lyon.

1657. DUFF, G. H. *Development of the Geoglossaceae*. Bot. Gaz. 69: 341-346. 1920.—A preliminary account without illustrations is presented. In *Cudonia lutea* there arises a small but conspicuous group of hyphae in a minute cushion of interwoven threads; these are not ascogonia but precursors of coiling procarps, and thus suggest the situation in lichens rather than in true ascomycetes. Following the analogy of lichens, these are called generative hyphac. Then comes a differentiation of vegetative tissues. As growth proceeds the outer tissue expands, remaining in its peripheral position as a true veil. The veil ruptures only over the well-matured hymenium. The generative hyphae assume a subapical position until they give rise to procarps, which are numerous coiling structures scattered irregularly through the cap. These coils are continued upward by multiseptate non-functional trichogynes; spermogonia and spermatia are lacking. The procarp cells are originally uninucleate; later the ascogonial cells become multinucleate. The fruiting surface now makes its appearance in the form of paraphyses beneath the veil.—The development of *Spathularia velutipes* is very similar, except that the procarps are reduced and lack trichogynes. *Trichoglossum hirsutum* is still more reduced in its sexuality, and does not possess a veil, though it does have long setae. The similarity of stages between these fungi and certain *Cladonia*-like lichens suggests a relationship, and the author feels that he has now for the first time supplied a basis of relationship between the discolichens and the Heterellineae.—H. C. Coates.

1658. GROVE, W. B. Species placed by Saccardo in the genus *Phoma*. Part III. Kew Bull. 1921: 136-157. Fig. 1-8. 1921.—The following new combinations are published: *Phomopsis brunneola* (Berkeley & Curtis), *P. Convallariae* (Westd.), *Placosphaeria maculata* (Cooke and Harkness), *Ascochyta Equiseti* (Desm.), *Pirostoma viridisporum* (Cooke), *Leptothyrium Phormii* (Cooke), *Eriothyrium pelliculosum* (B. and Br.), *Leptothyrium nitidum* (Rob.). Critical notes are given on other species. [See also Bot. Absts. 4, Entry 1102.]—E. Mead Wilcox.

1659. HARRY, M. E. Earth stars. Amer. Bot. 27: 86-87. 1921.

1660. KEBLER, LYMAN F. California bees. Jour. Amer. Pharm. Assoc. 10: 939-948. 1921.—A résumé of the subject of this and allied products, which have been veiled in considerable obscurity, is presented. This paper is the result of an investigation for the U. S. A. Post Office Department relative to the improper use of the mails in connection with this product. The following synonyms are given for California Bees: African Bees, Ale Nuts, Australian Bees, "Balm of Gilead," Bébées, Beer Bees, Beer Seeds, Beer Plant, Bees, Ginger Bees, Japanese Beer Seeds, and Vinegar Bees. The author quotes various authors and discusses the problems in connection with this substance.—Anton Hogstad, Jr.

1661. KEILIN, D. On the life history of *Dasyhelea obscura* (Diptera, Mematocera, Ceratopogonidae), with some remarks on the parasites and hereditary bacterian symbiont of this midge. Ann. and Mag. Nat. Hist. 8: 570-590. 1921.—A parasitic yeast, *Monosporella unicellularis*, destroys the larvae of this midge. The yeast produces an ascus containing a single spore. Only 1 other species, *M. bicuspidata*, is known.—The larvae contain 4 masses of bacteria which pass into the pupae and adult flies. The bacteria are transmitted to the eggs, and the young larvae upon hatching again show these masses of bacteria. A separate complete account of the bacteria is promised.—H. H. Clun.

1662. KUFFERATH, H. Études sur les levures du Lambic. Compt. Rend. Soc. Biol. 83: 1411-1412. 1920.—Lambic is a beer made in Brussels; little is known concerning its fermentation. It can be made only in the vicinity of Brussels. The present investigation deals with the isolation and study of a number of organisms obtained both from old and fresh brews.—Henri Micheels.

1663. LAIBACH, F. Untersuchung über einige Ramularia- und Ovularia-Arten und ihre Beziehung zur Askomyzengattung *Mycosphaerella*. [Investigations of certain Ramularia and Ovularia species and their relation to the genus *Mycosphaerella*.] Centralbl. Bakt. II. Abt. 53: 548-560. Fig. 1-12. 1921.—The connection of *Ramularia Knautiae* with the Mycosphaerella stage was experimentally demonstrated. Perithecia-like sclerotial bodies which bore typical Ramularia conidia at the neck were found on the same spot with the *Mycosphaerella* perithecia.—Anthony Berg.

1664. MURRILL, W. A. Dead men's fingers. Sci. Amer. 125: 94, 107. 3 fig. 1921.—Descriptions are given of the commoner stinkhorns, *Dictyophora*, *Ithyphallus*, *Mutinus*, and *Lysurus*.—Chas. H. Otis.

1665. NOVEAU, R. Descriptio fungorum novorum. Naturwissenschaften. Tijdschr. 2: 15-16. 1920. The following new species and varieties are described: *Dermocybe subsquamosa*, *Coprinus pyriformis*, *Galera tenera* Schaeff. var. *macrospora*, *Tricholoma conglobatum* Vitt. var. *intermedia*.—C. D. La Rue.

1666. OUDEMANS, C. A. J. A. Enumeratio systematica fungorum. Vol. III. xvi + 1313 p. Martinus Nijhoff: The Hague, 1921.—Volume 1 of this 5-volume work includes all hosts belonging to the lower groups of plants up to and including the monocotyledons; volumes 2, 3, and 4 will embrace the dicotyledons, and volume 5 will serve as an alphabetical register.

for the preceding volumes. Volume 3 contains hosts belonging to the 49 families—Caryophyllaceae to Vitaceae inclusive (Engler system). [For a more detailed account of this work see Bot. Absts. 8, Entry 2067.]—H. M. Fitzpatrick.

1667. PETCH, T. Studies in entomogenous fungi. The Nectriæ parasitic on scale insects. Trans. British Mycol. Soc. 7: 133-167. Pl. 3-5 (3 and 4 colored). 1921.—The present installment [see also Bot. Absts. 10, Entry 1233] includes an account of the following genera as they occur on scale insects: *Nectria*, *Lisea*, *Calonectria*, *Discofusarium*, *Podonectria*, *Broomella*, *Fusarium*, *Patouillardia*, and *Tetracladium*. *Discofusarium* is described as a new genus of the Tuberculariaceae and *Podonectria* as a new genus of the Hypocreaceae. The following species are described as new: *Nectria Tuberculariae*, *N. barbata*, *Calonectria coccidophaga*, *Podonectria echinata*, *Patouillardia Aleyrodis*, and *Tetracladium echinatum*.—W. B. McDougall.

1668. PEYRONEL. Un ifomicete dai conidi mesoendogeni. [A hypomycete with mesogenous conidia.] Boll. Mens. R. Staz. Patol. Veg. 2: 94. 1921.—In *Menispora microspora*, "a new species", found on chestnut, the spore is delimited within the conidiophore but the spore wall is not formed until the mass of protoplasm is exposed on the outside. Peyronel proposes the name mesendogenous.—D. Reddick.

1669. REA, CARLETON. Error in Boudier's micrometric measurements. Trans. British Mycol. Soc. 7: 218. 1921.—Attention is called to a statement by Maire to the effect that the measurements of spores given by Boudier in Bull. Soc. Hist. Nat. Afrique du Nord 8: 247. 1917 are about $\frac{1}{6}$ too large, due to an error in his micrometer scale.—W. B. McDougall.

1670. ROARK, E. W. The Septoria leaf-spot of Rubus. Phytopathology 11: 328-333. 1921.—The ascigerous stage of the *Rubus* leaf-spot fungus (*Septoria Rubi* West.) has been found on dead fallen leaves of *Rubus* species; and the fungus is here described as *Mycosphaerella Rubi* n. sp. Proof of the relationship of the pycnidial and the ascigerous forms is based on: (1) constant association of the 2 forms, where perithecia are present; (2) cellular connection of perithecia and pycnidia; (3) similarity of behavior in culture; and (4) production of the disease and of pycnidia from inoculations with ascospores. The fungus from the blackberry does not infect the raspberry, and vice versa; but, on morphological grounds, these are considered as merely strains of the one species.—B. B. Higgins.

1671. SCHWEPPINGER, B., O. HEYNE, und J. PFAU. Die Pilzflora um Altenburg. [The fungus flora of Altenburg.] Mitteil. Naturf. Ges. Osterlandes 35: 261-288. 1919.—The authors enumerate 245 species of fungi from the vicinity of Altenburg in Thuringia, 15 belonging to the Gastromycetes, 12 to the Discomycetes, 5 to the Pyrenomyces, and the remainder to the Hymenomycetes. Under each species full data are given regarding popular German names, edible or poisonous qualities, local distribution, and time of occurrence.—A. W. Etans.

1672. SMALL, W. Notes on species of *Colletotrichum* and *Phoma* in Uganda. Kew Bull. 1920: 57-67. 1920.—A study is reported on the pathogenicity of *Colletotrichum coffeaeum* Noack, the conidial stage of *Glomerella cingulata*. The following are probably synonymous: *Colletotrichum Coffeae* Massee (nomen nudum), *C. incarnatum* Zimmermann, *C. theobromicolum* Delacroix, and *Gloeosporium coffeaeum* Delacroix. Possibly *Colletotrichum luxificum* Van Hall and Drost and *C. erodwickii* Ban. are also to be included here. *Colletotrichum Theobromae* Appel and Strunk appears to be morphologically distinct from the above species. *Colletotrichum comelliae* Massee, which attacks tea, may be the same, and in fact Tunstall [Proc. Mycol. Workers of India 1919] states that this is the conidial stage of *Glomerella cingulata*. A brief note is appended on *Gloeosporium Musarum* Cooke and Massee, the cause of a serious black spot of banana fruits.—E. Mead Wilcox.

1673. Sydow, H., und P. Sydow. Notizen über einige interessante oder wenig bekannte Pilze. [Notes on some interesting or little known fungi.] Ann. Mycol. 18: 178-187. 1920 [1921].—A new genus of Uredinales, *Xenoste*, based on *Aecidium echinaceum* Berk. is proposed, the telial stage being described. *Puccinia Litseae* (Pat.) Diet. & P. Henn. is transferred to this genus. *Aecidium pumilio* Kze. is considered identical with *A. decoloratum* Schw. and the new combination *Endophyllum pumilo* (Kze.) Syd. is proposed to replace *E. decoloratum* (Schw.) Whetzel and Olive. Similarly *Aecidium guttatum* Kze. is considered identical with *A. circumscription* Schw. and the combination *Endophyllum guttatum* (Kze.) Syd. proposed. The new generic name, *Xenosoma*, is proposed to replace *Paulia* Lloyd (not *Paulia* Fée.) based on *Paulia resinaceum* Lloyd. *Zopfia rhizophila* Rabh. is redescribed and the conclusion reached that this genus belongs to the Aspergillaceae rather than the Perisporiaceae. The new genus *Rhizogene* is described founded on *Lasiobotrys Symphoricarpi* Syd. *Dimerosporium albo-marginatum* Sacc. is transferred to *Stigme*. The new generic name *Discarpe* is proposed to replace *Disperma* Thiess. (not *Disperma* C. B. Clarke); *D. bina* (Hark.) Syd. (*Physalospora bina* Harkn.) is the type species. *Ottelia deformans* Pat. is considered identical with *Dimerosporium Englerianum* P. Henn. and a full synonymy given. *Rosellinia ambigens* Sacc. is thought to be wrongly described and considered identical with *Phaeochora calamigena* (B. & Br.) Theiss. & Syd. *Diatractium* is proposed as a new generic name to replace *Trabutiella* Stevens (not *Trabutiella* Theiss. & Syd.) based on *Trabutiella Cordiae* Stevens. *Vialaea Ingae* Rehm, is also transferred to *Diatractium*. The writer takes exception to von Höhnel's inclusion of *Broomella Munkii* Speg. in the genus *Coccidiella* Hara, and considers it identical with *Uleodothis Balanscana* (S. R. B.) Theiss. & Syd. Since the former name has priority the new combination *Uleodothis Munkii* (Speg.) Syd. is proposed. *Uleodothis* is interpreted as having spores once septate near the base, and a new genus, *Uleodothella*, is proposed to include species having septa dividing the spores into equal cells. *U. aphanes* (Rehm sub *Polystomella*) Syd. is the type species. The authors discuss *Puiggaria* Speg., erected in 1910 to include the species of *Phyllachora* having a single locule in the stroma, and while considering it doubtful whether this character should be used as a basis for generic rank, call attention to the name *Mctachroa* Syd. & Butl. erected in 1911 on the same basis. *Myiocoprella Bakeri* Sacc. is redescribed and considered to be a typical member of the Polystomellaceae, not of the Microthyriaceae as originally described. The possibility of this genus being identical with *Schneepia* is discussed. *Microthyrium Grammatophylli* Sacc. is transferred to *Ellisiodothis*. *Microthyrium Browneanum* Sacc. is considered identical with *Eremothea philippensis* Syd. *Lembosia hormosiana* Sacc. is discussed. *L. Heptapleurii* Sacc. is transferred to *Echidnodes*. *Trichopeltella v. Höhn.* is considered identical with *Raciborskia* Speg. (not *v. Höhn.*). The possibility that *Micropelletella* Syd. and *Phragmothyriella* Speg. may be identical is considered. *Apiocrea* is proposed as a new genus to include species of *Hypomyces* in which the septa divide the spores into unequal cells. *A. chrysosperma* (Tul.) Syd. is the type species and *A. tulascana* (Plowr.) Syd. and *A. hyalina* (Schw.) Syd. are included. *Erinella scutosa* Sacc. is considered identical with *Ophionectria erinacea* Rehm. *Exosporium (Bakerella) exstimum* Sacc. is thought to be an immature example of *Exosporium pulchellum* Sacc. *Tetrachia singularis* Sacc. is considered identical with *Spegazzinia Meliolae* Zimm.—H. S. Jackson.

1674. Sydow, H., und P. Sydow. Novae fungorum species XVI. Ann. Mycol. 18: 154-160. 1920 [1921].—The authors describe as new 17 species of fungi in various groups as follows: *Septobasidium mexicanum* on *Cupressus* sp., and *Uromyces euphorbius* on *Phorodendron* sp. from Mexico; *Puccinia confinis* on *Scirpus caespitosus* from Courland, Russia; *Aecidium Dahliae* on *Dahlia variabilis* from Mexico; *A. melaenum* and *A. atrocrustaceum* both on *Diospyrum* sp. from the Philippine Islands; *Ustilago nyassae* on *Andropogon* from Nyassaland; *Melanotrichium Lamii* on *Lamium album* from Thuringia, Germany; *Peronospora indica* on *Calceolaria scabiosifolia* from India (with text figure); *Meliola microtricha* on *Ficus alba* from Straits Settlements, M. *Osmanthi* on *Osmanthus aquifolium* from Japan; *Herpotrichia Henkeliana* on *Phragmites communis* from Thuringia, Germany; *Diplochorella Burchelliae* on *Burchellia bubalina* in South Africa; *Catacauma Dussiae* on *Dussia martinicensis* from Guadeloupe;

Asterina singaporesis on *Derris sinuata* from Straits Settlements; *Taphrina mexicana* on *Prunus microphylla* from Mexico; *Monochaetia erataegina* on *Crataegus melanocarpa* var. *hyrcanica* from Caucasia.—*H. S. Jackson.*

1675. SYDOW, H., und P. SYDOW. Weitere neue Micromyceten der Philippinen-Inseln. [Additional new microscopic fungi from the Philippine Islands.] Ann. Mycol. 18: 98-104. 1920 [1921].—The following new species based on a collection communicated by O. A. Reinking are described with occasional notes: *Meliola Colladoi* on *Arythera* sp., *M. incompta* on *Phytolacca dinina*, *M. Reinkingii* on *Hippocratea* sp.; *Eutypa lagunensis* on *Manihot utilissima*; *Diaporthe lagunensis* on *Allamanda Hendersoni*; *Nummularia lamprostoma* on *Eugenia* sp.; *Mycosphaerella Homalanthi* Syd. on *Homalanthus alpinus*; *Leptosphaeria Marantae* on *Maranta arundinacea*; *Ophiostroma lagunensis* on *Homonoia riparia*; *Phylloachora maguilingensis* on *Polygalia* sp.; *Phaeodothis polystoma* on *Derris* sp.; *Asterinella venusta* on *Anaxagorea luzonensis*, *A. Elaeagni* on *Elaeagnus philippinensis*; *Phomopsis conspicua* on *Alpinia* sp.; *Colletotrichum Gliricidiae* on *Gliricidia sepium*, *C. conspicuum* on *Erythropalum scandens*; *Cladosporium microspilum* on *Cissampelos Pareira*; *Bactrodesmium mastigophorum* on *Parashorea plicata*, *B. Coryphae* on *Coryphae* sp.; *Helminthosporium makilingense* on *Paramignya monophylla*, *Helotorporium lagunense* on *Cajanus cajan*; *Isariopsis Colladoana* on *Cissampelos Pareira*.—*H. S. Jackson.*

1676. TAYLOR, MINNIE W. Internal aecia of *Puccinia albiperidia* Arthur. Phytopathology 11: 343-344. Fig. 1. 1921.—Normal aecia were found in abundance projecting into the hollow central cavity of a mummied rusted fruit of *Ribes glandulosum*.—*B. B. Higgins.*

1677. VUILLEMIN, PAUL. Une nouveau champignon parasite de l'homme, *Glenospora gandavensis*. [A new fungus parasitic on man, *Glenospora gandavensis*.] Compt. Rend. Acad. Sci. Paris 173: 378-380. 1921.

1678. WAKEFIELD, E. M. Additions to the mycological collection. Kew Bull. 1921: 344. 1921.

1679. WAKEFIELD, E. M. Fungi exotici: XXV. Notes on Uganda fungi. Kew Bull. 1920: 289-300. 1920.

1680. WAKEFIELD, E. M. On two species of *Ovulariopsis* from the West Indies. Kew Bull. 1920: 235-238. Fig. 1-2. 1920.—*Ovulariopsis Gossypii*, attacking Sea Island cotton, and *O. obclavata*, on *Tecoma leucorylon*, are described as new.—*E. Mead Wilcox.*

1681. WEISE, J. Über die Gattungen *Melanops* Nitschke und *Thuemenia* Rehm. [On the genera *Melanops* Nitschke and *Thuemenia* Rehm.] Ber. Deutsch. Bot. Ges. 37: 83-96. 1919.—A discussion of the generic characters, synonymy, and relationships of the 2 genera named.—*R. M. Holman.*

1682. WEISS, H. B. A bibliography of fungus insects and their hosts. Entomol. News 32: 45-47. 1921.—The list is arranged according to insect, and is as complete as possible for American literature.—*O. A. Stevens.*

1683. WORMALD, H. On the occurrence in Britain of the conidial stage of *Sclerotinia Mespili* Schell. Ann. Appl. Biol. 7: 173-177. 4 fig. 1920.—The occurrence, in England during the spring of 1920, of *Sclerotinia Mespili* Schell. on the leaves of medlar trees (*Mespilus germanica* L.) was recorded. Infected leaves were placed in moist chambers and the resulting conidial fructifications were examined microscopically.—*E. B. Lambert.*

1684. ZETTNOW. Kerne und Reservestoff bei Hefen und verwandten Arten. [Nuclei and reserve material of yeasts and related species.] Zeitschr. Hygiene u. Infektionskrankh. 90: 183-193. 3 pl. 1920.—Although a subject of physiological interest this study is approached by histological methods.—*W. H. Chambers.*

BACTERIA

1685. BOYER, J. Counting bacteria. *Sci. Amer.* 125: 29, 35. 5 fig. 1921.

1686. LOHNIS, F., and R. HANSEN. Nodule bacteria of leguminous plants. *Sci. Agric.* 1: 257-264. 1921.—Nodule bacteria are divisible into 2 groups: (a) *Bacillus radicicola* Beijs, type occurring in nodules on roots of clover, etc.; (b) monotrichic type isolated from cowpea, etc. *B. radicicola* is closely related to *B. radiobacter* and both lie near *B. coli* and *B. aerogenes*. The generic name *Rhizobium* is to be rejected.—*B. T. Dickson.*

1687. NAUMANN, EINAR. Eine einfache Methode zum Nachweis bezw. Einsammeln der Eisenbakterien. [A simple method for the demonstration or collection of iron bacteria.] *Ber. Deutsch. Bot. Ges.* 37: 76-78. 1919.—The author finds that by simply submerging clean glass plates in the localities concerned samples of the iron bacteria present can be secured in the form of a film upon the glass similar to the adhesion cultures of yeasts and other fungi.—*R. M. Holman.*

1688. SCALES, F. M. Induced morphologic variation in *B. coli*. *Jour. Infect. Diseases* 29: 591-610. Pl. 1-4. 1921.—Twenty-eight cultures of *B. coli* were collected from various sources and cultivated on media of different composition, with the purpose of inducing morphological variations. Special media, such as egg-starch agar, were found best for the purpose. A cell is described in which the bacteria can grow satisfactorily for a long time and be kept under constant observation. The results are summarized as follows: When grown on standard beef agar, *B. coli* multiplies almost entirely by fission but some cells produce gonidia. The number of the latter is usually small, varying with the strain. One culture was found which produced gonidia in abundance. The gonidia when liberated on standard media grow to rods. When transplanted to a medium of high osmotic pressure many rods die. The resultant growth is due either to the mass action of the organisms or to the presence of more resistant cells in the culture. The vitality of a culture is reduced by repeatedly transferring to media of high solution pressure. All degrees of sensitiveness to this environment have been found. Some rods and threads under special stimulus produce coccoidal bodies which arise from the growth of a nucleus within the parent cell. This type of growth was obtained on a medium of high solution pressure, i.e., 6 per cent salt and 2.5 per cent agar in the standard beef agar. These coccoidal growths may separate from the parent cell by the division characteristic of cells with either firm or soft walls. The division is accordingly sharply defined, as typically occurs in fission, or it may be drawn out as in the case of sagittal segmentation. Both kinds of division are found in the same culture. The coccoidal cells may liberate small cells by sagittal segmentation. The large free coccoidal bodies become shadow forms and disintegrate if left on the medium which produced them. A rod-like growth may originate within a mother cell and extend through the side wall of the parent. Odd shaped cells are usually found in cultures grown on media of high solution pressure. Those cultures that readily respond morphologically to a change in environment show a tendency on rich nitrogenous media, like egg agar or egg-starch agar, to form small coccoidal bodies at 37°C. and rods, larger than those on standard media, at 17°C. The great majority of the organisms tested in this work showed only slight variation under these conditions. The different morphologic types quickly revert to the normal laboratory type of *B. coli* when planted on a standard medium from one that has caused variation. In media of high solution pressure all cultures of *B. coli* retained their physiologic activity though one or more functions of the strains were much suppressed. Gas formation was greatly retarded in all cultures and growth was delayed in Clark and Lubs' synthetic medium; the latter effect was probably due to the absence of an organic buffer in this solution.—*Selmar A. Waksman.*

1689. UCHIMURA, Y. Experimentelle Untersuchungen zur Biologie des Rauschbrandbacillus. [The biology of *Bacillus chauvei*.] *Zeitschr. Hygiene u. Infektionskrankh.* 92: 291-321. 1921.—Fifteen strains of *Bacillus chauvei* were studied for variations in morphology, cultural characters on different media, sugar fermentation, pathogenicity, and immunity-producing properties.—*W. H. Chambers.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 1045, 1589, 1984)

1690. BAKER, FRANK COLLINS. The life of the Pleistocene or Glacial Period. Univ. Illinois Bull. 17⁴¹: 475 p., 57 pl. 1920.—The area discussed includes that part of North America which was covered successively by the continental ice sheets; and no data outside this area, except for comparison, are given. All the American Pleistocene plants recorded from these drift sheets or from the interglacial deposits between them are listed by states so that it is comparatively easy to ascertain the extent of the flora at any given interval and in any state.—Fossil plants are represented, usually by leaves and seed, and occasionally by pieces of wood sufficiently well preserved for identification. The best media for preservation are the fine silts and clays formed at the bottoms of bays, lagoons, and ponds; the largest number of species is found in such deposits, as at Toronto and Chicago.—The Pleistocene flora in any area is found to differ little from that of the same area today. At times during the interglacial intervals the cold temperate plants were driven southward, and their remains have been found to the south of their normal habitat of today. Likewise, during a period of warmer climate a warm temperate flora flourished at a higher northern latitude than at the present time. During each interglacial interval there was first a southward shifting of plant life as the glacial conditions became severe, followed by a northward shifting of plant zones as the climate became more genial. This to and fro migration of plants is strikingly recorded in many deposits where individual species are found north or south of their present habitat. The plants show little change during the whole of the glacial period,—but 7 of 145 species recorded being extinct.—The vertical distribution by interglacial intervals shows that 12 species are known from the 1st, or Aftonian, interval, 14 from the 2nd, or Yarmouth, interval, and 68 from the 3rd, or Sangamon interval. None are recorded from post-glacial or Wabash deposits. The most complete floral deposits are found at Toronto (Sangamon interval) and Chicago (post-glacial). The Toronto deposits illustrate the effect of the oncoming of a glacial period (64 species represented); the Chicago deposits illustrate the gradual change from glacial to temperate conditions. Together, these 2 deposits make a fairly complete cycle of an interglacial interval showing the effect on the vegetation.—The plants of the Pleistocene are divided among the following groups: bryophytes, 13 species; pteridophytes, 8; gymnosperms, 16; monocotyledons, 20; dicotyledons, 90. Trees predominate, perhaps because the woody leaves and stems are more readily preserved. Among the trees the following are represented: *Taxus*, 2 species; *Pinus*, 4; *Larix*, 2; *Picea*, 3; *Abies*, 1; *Thuja*, 1; *Salix*, 2; *Populus*, 3; *Juglans*, 2; *Carya*, 3; *Corylus*, 1; *Betula*, 3; *Fagus*, 1; *Quercus*, 11; *Ulmus*, 3; *Platanus*, 1; *Crataegus*, 3; *Prunus*, 3; *Acer*, 6; *Tilia*, 2; and *Fraxinus*, 3.—Extinct species recorded are: *Larix churchbridgeana* Penhallow, *Quercus macyana* Penhallow, *Gleditsia donensis* Penhallow, *Acer torontonensis* and *A. pleistocenica* Penhallow, *Vitis pseudorotundifolia* Berry, *Tilia dubia* Newberry. An extensive and probably nearly complete bibliography and an analytical index complete the volume.—*F. C. Baker.*

1691. BERRY, EDWARD W. Tertiary formations of western South America. Proc. First Pan Pacific Sci. Conference 845-865. 1921.—This article contains various references to the Tertiary floras of Columbia, Ecuador, Peru, Bolivia, and Chile, with correlations and geological discussions.—*E. W. Berry.*

1692. BUSCALIONI, L. La critica del Prof. G. Negri al mio lavoro sugli endemismi ed esodemismi della flora italiana. [Prof. G. Negri's criticism of my paper on endemic and non-endemic species in Italian flora.] Malpighia 29: 33-45. 1920.—The author defends his hypothesis (published in 1914) that the origin of a xerothermic flora in certain alpine regions of Italy may be explained, at least in part, by the formation of water basins at the end of the glacial period.—*Edith K. Cash.*

1693. ENWARNS, W. N. Fossil coniferous wood from Kerguelen Island. Ann. Botany 35: 604-609. Pl. 23, 4 fig. 1921.—Specimens of fossil wood from Kerguelen Island (lat. 49°S.) now located in the British Museum were sectioned and examined. The 2 species found,—*Cupressinoxylon antarcticum* Beust and *Dadoxylon kerguelense* Seward,—are described in detail.—W. P. Thompson.

1694. GUPPY, H. B. America's contribution to the story of the plant-world. Jour. Ecol. 9: 90-94. 1921.—Appreciation is expressed for the work of American students of fossil angiosperms, especially that of Knowlton, Hollick, and Berry, whose investigations are said to be important contributions toward solving problems connected with the sudden appearance of angiosperms in Cretaceous times. Data have been found tending to show that the rise of angiosperms was not so sudden as it has seemed, and the importance of evolutionary centers of these plants upon very ancient land-surfaces such as the Appalachian region has been given more emphasis. Guppy also suggests that data from South America may answer the problem of a closer relationship of the Pacific Islands to the flora of the west rather than the east in spite of opposing ocean currents.—Geo. D. Fuller.

1695. THOMAS, H. H. An Ottokaria-like plant from South Africa. Quart. Jour. Geol. Soc. London 77: 285-288. Fig. 2. 1921.—The author describes *Ottokaria Leslii* from the Vereeniging sandstone (Permian) of the Transvaal, and tentatively interprets it as a woody cupule in which a seed or seeds were produced, suggesting that it may represent the fructification of *Glossopteris*. Both the interpretation and suggestion are confessedly highly subjective.—E. W. Berry.

1696. WALKOM, A. B. On *Nummulospermum*, gen. nov., the probable megasporangium of *Glossopteris*. Quart. Jour. Geol. Soc. London 77: 289-295. Pl. 21. 1921.—Because of its association in the rocks with foliar remains, the author regards *Nummulospermum bonnense* from the Permian of Queensland, a supposed platyspermic seed, as the seed of *Glossopteris*. If this inference proves correct it means that this widespread type, which gives its name to the Permian provincial flora that succeeded the Carboniferous cosmopolitan flora, is a pteridosperm and not a fern, a conclusion suspected by several previous students.—E. W. Berry.

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 890, 892, 900, 902, 909, 927, 968, 969, 971, 980, 1029, 1033, 1073, 1074, 1110, 1119, 1134, 1135, 1136, 1141, 1142, 1143, 1201, 1208, 1272, 1287, 1292, 1295, 1299, 1311, 1387, 1435, 1442, 1444, 1451, 1478, 1550, 1565, 1572, 1586, 1647, 1650, 1655, 1656, 1661, 1670, 1672, 1977, 1979, 2023, 2049)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1697. ANONYMOUS. Malattie riscontrate dal 16 Febb. al 15 Marzo. [Diseases observed from February 16 to March 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 3: 2-3. 1920.—Among the diseases listed are the ink disease of chestnut, *Phyllosticta japonica* on *Mahonia*, *Sphaeropsis Malorum* on apple, *Nectria ditissima* and *Venturia inaequalis* on pear, *Botrytis vulgaris* on peppers and tomatoes, and *Cercospora Violae* on violets.—Edith K. Cash.

1698. ANONYMOUS. Malattie riscontrate dal 16 Maggio al 15 Guigno. [Diseases observed from May 16 to June 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 6: 2-4. 1920.—The fungus diseases listed are: *Clasterosporium carpophilum* on cherry, *Oidium Erynnii japonici* on *Eryngium*, *Pestalozzia brevipes* on *Kentia*, *Fusicladium dendriticum* on apple,

Taphrina bullata on pear, *Sphaerotheca pannosa* and *Exoascus deformans* on peach, *Botrytis vulgaris* and *Actinonema Rosae* on rose, *Exoascus Pruni* on plum, anthracnose, *Rosellinia necatrix*, and *Plasmopara viticola* on grape, *Peronospora parasitica* on *Capsella*, and *Heterosporium echinulatum* on carnation.—*Edith K. Cash.*

1699. ANDERSON, H. W., and P. J. [ANDERSON]. The parasitic fungi of Montgomery County. I. Proc. Indiana Acad. Sci. 1919: 175-222. 1921.—The paper increases the number of known parasitic fungi in this county to 336 species on 560 hosts belonging to 371 species. A host index and an index to genera are included.—*F. C. Anderson.*

1700. CAUM, EDW. L. A contribution to a check-list of sugar cane fungi. Exp. Sta. Hawaiian Sugar Planters' Assoc. Bot. Ser. Bull. 3: 66-97. 7 fig. 1921.—The author gives a preliminary list of fungi reported as occurring on sugar cane (*Saccharum officinarum*) either as parasites or saprophytes, in any part of the world.—*J. M. Westgate.*

1701. CROMWELL, R. O. Observations of fungous diseases during the year. Rept. Iowa State Hort. Soc. 54: 69-75. 1919 [1920].—The author states that the apparent control of cedar-rust by spraying apple trees is due to the fact that the rust spores are discharged very early, before there is any foliage on the fruit trees. Apple blotch [*Phyllosticta solitaria*], ordinarily unimportant in Iowa, was epidemic along the Missouri River, and scab [*Venturia inaequalis*] was worse than usual, both because of infection before the usual spraying period. Experimental spraying for raspberry anthracnose has given good results during 2 seasons, both in controlling the disease in old plantings and in preventing infection of young plantings. Lime-sulphur was better than Bordeaux.—*Jessie Wood.*

1702. DICKSON, B. T. Plant diseases of 1920-21. Ann. Rept. Quebec Soc. Protection of Plants 13: 66-67. 1921.—Black rot of apple (*Physalospora cydoniae*), silver leaf of apple (*Stereum purpureum*), bean blight (*Pseudomonas phaseoli*), apple storage rot (*Penicillium glaucum*), and mosaic diseases of pea bean, Windsor bean (*Vicia faba*), sweet pea, red-, alsike-, trefoil-, white-sweet-, and yellow-sweet clovers, raspberry, potato, tomato, and tobacco were noted. Mottling of fruit on tomatoes was common.—*B. T. Dickson.*

1703. EASTHAM, J. W. Report of provincial plant pathologist. British Columbia 15th Ann. Rept. Dept. Agric. 1920: 51-55. 2 fig. 1921.—The author reports *Plasmodiophora Brassicae* from the city of Victoria, *Oospora pustulans* on potato in the lower Fraser valley, and *Phragmidium imitan*s on red raspberry. Potato mosaic and breakdown of Jonathan apples caused considerable loss during the season. Burgundy and Bordeaux mixtures gave good control of apple anthracnose.—*J. W. Eastham.*

1704. FROMME, F. D. The yellows disease of cabbage in southwest Virginia. Virginia Agric. Exp. Sta. Bull. 226. 9 p., 4 fig. 1921.—Much of the best cabbage land in southwest Virginia is infested with yellows (*Fusarium ronglutinans*) and the annual loss is estimated at 25-30 per cent. Two yellows-resistant strains developed at the Wisconsin Experiment Station, grown in a test plot on "cabbage sick" soil in comparison with 2 commercial varieties commonly grown in the locality, produced a good yield whereas the commercial strains were almost complete failures. The yields in tons computed on the acre basis were: Wisconsin All Seasons, 15.8; Wisconsin Hollander, 11.8; Copenhagen Market, 3.2; All Head Early, 1.9.—*F. D. Fromme.*

1705. GARDNER, MAX W. Indiana plant diseases, 1919. Proc. Indiana Acad. Sci. 1919: 135-156. 1921.—The author gives a detailed account of diseases of economic importance occurring on about 45 hosts in Indiana during the summer of 1919. The weather conditions are discussed in their relation to the prevalence of plant diseases.—*F. C. Anderson.*

1706. GARDNER, MAX W. Indiana plant diseases, 1920. Proc. Indiana Acad. Sci. 1920; 187-208. Fig. 1-12. 1921.—Weather conditions and diseases, arranged according to hosts, are discussed in this summary of plant diseases in Indiana during the summer of 1920. The author lists 20 hosts on which diseases of outstanding economic importance were found, and 21 hosts with diseases not previously recorded for Indiana.—F. C. Anderson.

1707. LYON, H. L., and H. ATHERTON LEE. Citrus canker in the Hawaiian Islands. Phytopathology 11: 377. 1921.

1708. PORTER, R. H. Truck crop diseases of 1920 and their control. Iowa State Hort. Soc. Rept. 55: 320-322. 1920 [1921].—Hot formaldehyde treatment of potatoes is described and control measures for black leg and black rot of cabbage, black rot of sweet potato, tomato wilt (*Fusarium*), and raspberry anthracnose are given.—R. J. Haskell.

1709. SPALDING, PERLEY. Plant disease survey of England and Wales. Phytopathology 11: 376. 1921.

1710. VOGLINO, P. Malattie riscontrate dal 16 Gennaio al 15 Febb. [Plant diseases observed from January 16 to February 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 2: 2-3. 1920.—The fungus and bacterial diseases listed include *Bacterium tumefaciens* on peach, *Dothichiza Populea* on poplar, *Sclerotinia libertiana* on cabbage, *Bremia Lactucae* on chicory, and *Botrytis vulgaris* on geranium.—Edith K. Cash.

1711. VOGLINO, P. Malattie riscontrate dal 16 Marzo al 15 Aprile. [Diseases observed from March 16 to April 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 4: 2-3. 1920.—The list includes *Gibberella moricola* on mulberry, *Colletotrichum gloeosporioides* on lemon, apple canker (*Nectria ditissima*), *Phragmidium subcorticatum* on rose, *Capnodium Taxii* on yew, *Peronospora Schleideni* on onion, and *Botrytis vulgaris* on peppers.—Edith K. Cash.

1712. VOGLINO, P. Malattie riscontrate dal 16 Aprile al 15 Maggio. [Diseases observed from April 16 to May 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 5: 2-3. 1920.—The following fungus diseases were observed: *Clasterosporium amygdalae* on cherry, *Fusarium lateritium* on mulberry, *Monilia cinerea* on pear, *Exoascus deformans* on peach, *Fusicladium radicosum* on poplar, *Fusicladium orbiculatum* on *Pirus terminalis*, *Gloeosporium nervosum* on *Platanus*, *Gloeosporium ampelinum* on grape, *Botrytis parasitica* on *Hemerocallis*, *Bremia Lactucae* on lettuce, and *Pythium DeBaryanum* on peppers.—Edith K. Cash.

1713. VOGLINO, P. Malattie riscontrate dal 16 Giugno al 15 Luglio. [Diseases observed from June 16 to July 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 7: 3-4. 1920.—Among the diseases mentioned are *Fusicladium dendriticum* on apple, *Septoria piricola* on pear, *Sphaerotheca pannosa* on rose, *Rosellinia necatrix* and *Plasmopara viticola* on grape, *Ophiobolus graminis*, *Fuccinia glumarum*, and *Tilletia Triticici* on wheat, and *Phytophthora infestans* on potato.—Edith K. Cash.

1714. VOGLINO, P. Malattie riscontrate dal 16 Luglio al 15 Agosto. [Diseases observed from July 16 to August 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 8: 2-3. 1920.—The following fungus and bacterial diseases are listed: *Phleospora castanicola* on chestnut, *Botrytis Diopyri* on *Diopyros kaki*, *Fusicladium dendriticum* on apple, *Marsonia Juglandis* on walnut, *Sphaerotheca pannosa* on peach, *Peronospora larvata* and *Oidium Tuckeri* on grape, *Sclerotinia libertiana* on cabbage, *Phytophthora infestans* and *Bacillus solanipерda* on potato, and *Pseudoperonospora cubensis* on melon.—Edith K. Cash.

1715. VOGLINO, P. Malattie riscontrate dal 16 Agosto al 15 Settembre. [Diseases observed from August 16 to September 15.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 9: 3. 1920.—The list includes *Phytophthora cactorum* on fir seedlings, *Rosellinia necatrix* on

maple and grape, *Septoria Azaleae* on *Azalea*, *Sclerotinia fructigena* on quince, *Septoria limonum* on lemon, *Phylactinia suffulta* on hazelnut, *Gymnosporangium sabinae* on pear, *Sphaeropotheca pannosa* on peach, *Sclerotinia libertiana* on beet, and *Septoria petroselini* on parsley.—*Edith K. Cash.*

1716. VOGLINO, P. Malattie riscontrate dal 16 Sett. al 15 Ottobre. [Diseases observed from September 16 to October 15.] *Pubbl. Mens. R. Osservatorio Fitopatol. Torino* 10: 3-4. 1920.—The list of diseases observed includes the following due to fungi: *Phyllosticta* sp. on *Diospyros kaki*, *Polystigma ochraceum* on almond, *Funago vagans* on apple, *Melampsora allii-populina* on poplar, *Botrytis vulgaris* on grape, *Cystopus candidus* on capers, *Erysiphe communis* on lupine, and *Septoria petroselini* v. *Apiti* on celery.—*Edith K. Cash.*

1717. WATERS, R. Fireblight. *New Zealand Jour Agric.* 22: 143-145. 1921.—Isolations from pear, hawthorne, and medlar gave cultures of bacteria similar to *Bacillus amylovorus*. Cross inoculations gave typical fireblight symptoms on all 3 hosts.—*N. J. Giddings.*

1718. WESTON, WILLIAM H., Jr. A note relative to the recent appearance of sugar cane downy mildew in the Philippines. *Phytopathology* 11: 371-375. 1921.—Downy mildew (*Sclerospora Sacchari*) has recently been found near Manila on cane grown from cuttings said to have been grown and selected at the experiment station of the Japanese Government in Formosa. They were dipped into Bordeaux mixture before entering the Philippine Islands.—*B. B. Higgins.*

THE PATHOGEN (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

1719. BLARINGHEM, L. Note sur le Blanc des Chênes. [Notes on the powdery mildew of oaks.] *Bull. Soc. Path. Vég. France* 8: 107-108. 1921.—At Anger, in the center of France, *Oidium* is particularly severe on the native oaks, *Q. toza* and *Q. pedunculata* (particularly the purpuraceous, heterophyllous, fastigate forms), and on the American white oak (*Q. alba*). But little was found on *Q. macrocarpa*, *Q. crispula*, *Q. castaneafolia*, *Q. pseudosuber*, *Q. miribekii*, and *Q. humilis* (*Q. ilex* × *Q. toza*). None was observed on *Q. cerris*, *Q. aciculosa*, *Q. coccifera*, *Q. serrata*, *Q. daimyo*, or on the American oaks having purple leaves in the winter. The resistance of these American species (*Q. aquatica*, *Q. coccinea*, *Q. nigra*, *Q. rubra*, *Q. phellos*), which French horticulturists call American oaks, has led to the erroneous opinion that the oaks of America are resistant to powdery mildew.—*Jean Dufrenoy.*

1720. CHEN, CHUNJEN C. Internal fungous parasites of agriculture seeds. *Maryland Agric. Exp. Sta. Bull.* 240. 29 p., 8 pl., 22 fig. 1920.—The author reviews the literature and records experiments showing that some of the fungi and bacteria occurring in the seeds of host plants are pathogenic when in contact with seedlings under favorable conditions, and that only a few forms apparently are non-parasitic. He states that the internal parasites of agricultural seeds have a direct bearing on crop production. The forms in which pathogens may be carried in the seed are given. Studies were made with the seeds of asparagus, cabbage, common bean, cowpea, Lima bean, soy-bean, sweet corn, tomato, and wheat. No pathogens were found in the seeds of barley, alfalfa, timothy, red clover, and crimson clover.—*E. C. Auchter.*

1721. CURTIS, K. M. The significance of the development in New Zealand of the perithecia of the apple and pear black spot organisms (*Venturia inaequalis* and *Venturia pirina* respectively). *New Zealand Jour. Agric.* 23: 215-218. 1921.—The perithecia of *Venturia inaequalis* and *V. pirina* were first found on Sept. 14 and there was abundant ascospore discharge about 1 week later, during a prolonged rainy spell. The perithecia mature within 5 or 6 weeks after beginning to form. The development of perithecia is of scientific interest because of the very mild winters. Diseased fruits produced viable conidia at irregular intervals throughout the winter and spring until after apple foliage was well developed. The fungus was also found surviving the winter in diseased twigs.—*N. J. Giddings.*

1722. EISLER, M. und L. PORTHEIM. Über die Biologie des *Bacillus carotovorus* (Jones). [Notes on the biology of *Bacillus carotovorus*.] Centralbl. Bakt. II Abt. 53: 7-33. 1921.—In this investigation considerable stress is laid on the problem of immunity in plants as determined by the virulence of the parasite and the resistance of the host. A culture of *B. carotovorus*, which, after constant growth on agar media for a series of years had become attenuated to the extent that it was no longer able to rot carrot discs, was again made virulent by the following method: The organism was first grown on boiled carrot plugs. On certain plugs, due to higher acid content, no growth was obtained. The organism was transferred from cooked plugs to plugs previously heated at 56°C. and thence to raw plugs. Uniform infection of raw plugs could be obtained only after a series of transfers. In the juice of boiled carrots the attenuated strain developed according to the acid concentration. The rejuvenated strain, however, grew well in all cases where the attenuated strain did not develop at all or only sparingly. With the virulent strain typical soft rot could be produced on carrot.—*Anthony Berg.*

1723. HENRICK, JAMES B., and MAX W. GARDNER. Seed transmission of soy bean bacterial blight. Phytopathology 11: 340-342. Pl. 17. 1921.—Greenhouse tests with soybean (*Soja max*) from diseased and from healthy pods have confirmed former suggestions that seed from diseased pods carry the blight-producing organism, *Bacterium Sojae*.—*B. B. Higgins.*

1724. HOCKEY, J. F. Germination of teliospores of *Puccinia Antirrhini*. Ann. Rept. Quebec Soc. Protection of Plants 13: 54-57. 1921.—Teliospores were found in separate telia and also in uredinia and were exposed to temperatures varying from 2.6 to -25°C. for periods varying from 1 to 14 days. Hanging drop cultures were then made at room temperature, 12-22 per cent germination resulting. Promycelia were 4-celled and most frequently grew from the apical cell. Sporidia were 4-9 μ in diameter.—*B. T. Dickson.*

1725. HOERNER, G. R. Miscellaneous studies on the crown rust of oats. Amer. Jour. Bot. 8: 452-457. 1 pl. 1921.—The author, studying the infection capabilities of the crown rust of oats, *Puccinia coronata*, found that urediniospores borne on the surface of oat seed do not offer a ready means of infecting seedlings developed therefrom, and that oat seedlings emerging through soil heavily covered with viable urediniospores are not readily infected. Under Minnesota conditions a perennial mycelium capable of producing a new crop of urediniospores after overwintering does not exist. Urediniospores do not remain viable over winter on oats nor does continued production take place. Environmental factors influence the development of the rust on oats as well as the rate of pustule formation. Anthocyanin pigment formation surrounding uredinia on infected oat leaves is a common phenomenon but is not correlated with resistance or susceptibility. The appearance of telia on seedling oat leaves is not a reliable basis for determining the resistance of oat varieties.—*E. W. Sinnott.*

1726. KASAI, MIKIO. On the morphology and some cultural results of *Fusarium Solani* (Mart.) Appel et Wollenweber, an organism which causes dry rot in the Irish potato tubers. Ber. Obara Inst. Landw. Forsch. 1: 519-542. Pl. 8-11. 1920.—A species of *Fusarium* causing dry rot of potato tubers in the field and during storage was isolated and found to be identical with *Fusarium Solani*. Results obtained with 16 cultures are briefly mentioned.—*F. F. Halma.*

1727. KILLIAN, KARL. Über die Ursachen der Spezialisierung bei den Ascomyzeten. I. Die *Monilia cinerea* der Kirschen. [The causes of specialization in the ascomycetes. I. *Monilia cinerea* of cherry.] Centralbl. Bakt. II Abt. 53: 560-597. Pl. 1, fig. 1-2. 1921.—Strains of *Monilia cinerea* were isolated from sweet- and sour-cherry fruits and from sour-cherry twigs. These strains, when grown on media composed of fruit pomace, fruit and vegetable decoctions, and on synthetic media showed distinct and constant morphological differences. The sweet-cherry strain being more labile in its characteristics could also be

more easily influenced by the composition of the medium. By the addition of malic acid to a medium upon which the 2 strains otherwise developed normally, the sweet-cherry strain could be temporarily influenced to approach the growth characteristics of the sour-cherry form in every respect. The sweet-cherry strain produced typical disease symptoms when inoculated on the sour cherry, and when reisolated from the sour-cherry fruit conformed to its former growth characteristics. When reisolated from wood upon which it had grown for 10 months, the growth type showed characteristics of both strains. When grown beside colonies of the original sweet-cherry strain the colonies merged, but when grown beside colonies of the sour-cherry strain, antagonism was exhibited. Inoculations with both strains were also made on sweet cherry and on apple; in both cases the disease symptoms were appreciably different. The author concludes that there are 2 strains of *Monilia cinerea*, a sweet-cherry strain, *Monilia cinerea avium*, and a sour-cherry strain, *Monilia cinerea cerasi*. It is suggested that the sweet-cherry strain developed from the sour-cherry strain as a result of changes which took place in the chemical composition of the host in the course of modification by selection.—*Anthony Berg.*

1728. KUNKEL, L. O. A possible causative agent for the mosaic disease of corn. *Exp. Sta., Hawaiian Sugar Planters' Assoc. Bot. Scr. Bull.* 3: 44-58. *Pl. 5-15, fig. 2.* 1921.—Definite foreign bodies believed to be living are always present in diseased cells of mosaic corn plants. It is suggested that these foreign bodies may be similar to those associated with certain virus diseases of man and lower animals (e.g., Negri bodies in rabies).—*J. M. Westgate.*

1729. LIPMAN, C. B. A contribution to our knowledge of soil relationships with Citrus chlorosis. *Phytopathology* 11: 301-305. 1921.—A comparative study was made of soils bearing normal and those bearing chlorotic citrus trees. In the fields under observation the chlorotic trees were confined to small areas known locally as corrals. Analysis of a water solution of the upper 24 inches of corral soil and of the normal soil from the same field showed that the corral soil was comparatively poor in soluble nitrogen, calcium, magnesium, and in total soluble solids; but had a large excess of soluble phosphorus, sodium, and potassium. The soluble iron was somewhat greater in the corral than in the normal soil, which would indicate a need of caution in attributing chlorosis to lack of available iron. The grouping of phosphorus, sodium, and potassium on the one hand and of nitrogen, calcium, and magnesium on the other in these 2 very different soil types seems very significant.—*B. B. Higgins.*

1730. MURPHY, PAUL A. The presence of perennial mycelium in *Peronospora Schleideni* Unger. *Nature* 108: 304. 1921.—Mycelium persists in bulbs of common onion (*Allium cepa*), potato onion, and shallot (*Allium ascalonicum*), and survives on bulbs left in the ground over winter. "There is a time in early spring, generally in April, when the mildew is found only on onions the bulbs and leaves of which are permeated with mycelium. These plants appear to act as important centers of infection."—*O. A. Stevens.*

1731. NEWTON, M. A preliminary note on the occurrence of biologic forms of wheat stem rust in Western Canada. *Sci. Agric.* 1: 213. 1921.—In Canada 11 strains have been isolated, all similar to those isolated in the U. S. A. by Stakman. A virulent strain is widely distributed in Canada.—*B. T. Dickson.*

1732. PAMEL, L. H. Recent literature on fungous diseases of plants. *Rept. Iowa State Hort. Soc.* 54: 104-161. 1919 [1920].—The author gives abstracts of and quotations from recent publications on diseases of various plants, and on physiology and taxonomy of fungi. Recent lists of fungi are also noted briefly. Biographical sketches of William Gilson Farlow and Charles Horton Peck, shorter notes on other pathologists and mycologists, and brief remarks concerning the work of various organizations, are given.—*Jessie Wood.*

1733. TOUMEY, J. W. Damage to forests and other vegetation by smoke, ash and fumes from manufacturing plants in Naugatuck Valley, Connecticut. *Jour. Forestry* 19: 367-373. *Fig. 6.* 1921.—The increase in manufacturing in 1914 caused considerable damage to vegeta-

tion, and the current annual increment of forest trees has been greatly reduced. Most of this damage was due to SO_2 liberated in the air. Ash from the brass mills causes damage to surface-rooted vegetation in amounts of 25 gm. or over per square foot, concentrations up to 200 gm. killing all such vegetation in 2 weeks. Lime applications not only prevent injury but stimulate growth.—*E. N. Munns.*

1734. ZILLIG, HERMAN. Über spezialisierte Formen beim Antherbrand, *Ustilago violacea* (Pers.) Fuck. [Specialized forms in anther smut, *Ustilago violacea*.] Centralbl. Bakter. II Abt. 53: 33-73. 1921.—A wide range was noted in the percentage of infection on different species of the Caryophyllaceae, even in the same locality. Morphological distinctions could not be observed in the spores. In the sporidia, however, slight variations in size and shape could be noted. The sporidia of the strains from *Dianthus* spp. were generally larger and more regularly formed than those from other species. Also, a slight distinction between the sporidia of wild and cultivated forms was noted. Physiological behavior during fusion and hybridization of certain strains is characteristic. When isolating the 2 sexes of sporidia in the strain from *Dianthus deltoides* on gelatin plates, according to the method of Kneip, 1 sex is inhibited. Hybridization of sporidia could be obtained in every possible combination with all forms studied. The sporidia of the strain from *Saponaria officinalis* and *Silene vulgaris* fuse with difficulty and only after a long time. All forms of inoculation excepting seed inoculation were obtained. In cross inoculation, positive results were obtained as follows: *Dianthus silvestris* with the strain from *Dianthus Carthusianorum*; *Melandrum album* and *M. rubrum* with strain from *M. album* \times *M. rubrum*; *Dianthus caryophyllus* with the strain from the cultivated *Dianthus Carthusianorum* "Napoleon III." Attempts to inoculate the strain from *Melandrum album* on *M. rubrum* and the strain from *Saponaria officinalis* on *S. ocymoides* failed. In the cross inoculation the following new hosts were added to the list: *Agrostemma Githago*, *Silene noctiflora*, *Dianthus chinensis*, and *Tunica prolifera*. The author concludes that it is quite probable that most of the host plants have their own specialized forms of *Ustilago violacea*.—*Anthony Berg.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1735. ANONYMOUS. Die Krebswiderstandsfähigkeit der Kartoffelsorten Deutschlands. [Wart resistance of German potatoes.] Oesterreich. Zeitschr. Kartoffelbau 1: 35-36, 45-46. 1921.—The author lists immune and resistant potato varieties, with notes, from a compilation of German variety tests by E. Werth [see Bot. Absts. 9, Entry 644].

1736. ANONYMOUS. Wart disease of potatoes. Scottish Jour. Agric. 4: 68-72. 1921.—Some 400 samples of potatoes were tested for susceptibility to wart disease. A partial list of immune and susceptible varieties is given, with additional notes on 6 outstanding new varieties, namely, Katie Glover, Red-eyed Rogue in Ally, K. of K., Crusader, Nithsdale, Irish Chieftain.—*H. V. Harlan.*

1737. MCROSTIE, G. P. The immunization of plants. Ann. Rept. Quebec Soc. Protection of Plants 13: 73-77. 1921.—[See Bot. Absts. 10, Entry 106.]

1738. SNELL, WALTER H. The relation of the moisture content of wood to its decay. Paper Indust. 3: 283-285. Fig. 1-2. 1921.—Muench has shown that neither sap-staining nor wood-destroying fungi will live in wood containing more than 143 per cent (based on the oven-dry weight of the wood) of water. The optimum moisture content for their growth is 33-74 per cent of the dry weight of the wood. The author confirms Muench's data in tests on loblolly pine sapwood and Sitka spruce.—*H. N. Lee.*

1739. TURRILL, W. B. Wheat in East Africa. Kew Bull. 1920: 78-79. 1920.—Hybrids highly resistant to both *Puccinia glumarum* and *P. graminis* were secured by crossing Egyptian wheat, susceptible to *P. glumarum* but highly resistant to *P. graminis*, with Australian "Nut Cut" wheat, almost immune to *P. glumarum* but susceptible to *P. graminis*. *Ustilago Tritici* is reported as common in East Africa, and *Cladosporum herbarum* does much damage to ripe wheat.—*E. Mead Wilcox.*

DESCRIPTIVE PLANT PATHOLOGY

1740. ANONYMOUS. Fungoid diseases attacking lemons. New Zealand Jour. Agric. 23: 108-109. 1921.—The 3 diseases under consideration are verrucosis, gray scab, and brown rot (*Pythiacystis citrophthora*). Bordeaux mixture 4-4-50 was very effective and caused a minimum of injury. Bordeaux containing more copper was more effective, but likely to produce considerable injury. Lime sulphur was not so effective and very likely to cause injury.—*N. J. Giddings.*

1741. ANONYMOUS. Ziekten van aardappelknollen. [Diseases of the potato tuber.] Verslag en Mededeel. Phytopath. Dienst Wageningen 9. 15 p., pl. 1-3. 1921.—A popular account of potato diseases caused by parasites as well as those of non-parasitic origin is given.—*D. Atanasoff.*

1742. ASHBY, S. F. Root disease of sugar-cane. Agric. News [Barbados] 20: 158-159. 1921.—This note on the nature of sugar-cane root disease includes references to the early work of Wakker and Howard on *Marasmus Sacchari* as the causal fungus and to recent publications by Matz in Porto Rico and Carpenter in Hawaii. The latter attach greater importance to fungi of the *Rhizoctonia* and *Pythium* types. It is not quite clear, however, whether the condition called root rot in Hawaii is the same as that generally known as root disease in the West Indies.—*J. S. Dash.*

1743. BARSS, H. P. Diseases of prunes. Ann. Rept. Oregon State Hort. Soc. 12: 61-69. 1921.—Leaf rolling, "gum spot" or drouth spot, and "internal browning" are cited as the most conspicuous physiological troubles. Judicious irrigation and the promotion of a healthy and moderate growth are recommended as a possible cure. The most important parasitic diseases of the prune are heart rot, mushroom root rot, pink bracket rot, leaf spot (*Cylindrosporium*), and brown rot. Preventive measures are recommended for the 1st 3 parasitic diseases. Leaf spot and brown rot are controlled by spraying.—*A. E. Murneek.*

1744. BEWLEY, W. F. "Damping off" and "foot rot" of tomato seedlings. Ann. Appl. Biol. 7: 158-172. 1920.—In studying "damping off" of tomato seedlings, apparently caused by *Phytophthora terrestris*, *P. cryptogea*, and *Rhizoctonia Solani*, it was found that the organisms do not occur in some soils but exist in definite quantities in others. Infected soil and water are the chief carriers, but in some cases seed boxes and pots were found to carry the infective agent over from one season to another. Treating the soil by steam and disinfection with formaldehyde proved effective preventive measures. Soil from a nursery where "damping off" had been very destructive gave 44-48 per cent diseased seedlings in the check pots. Steaming of this soil for 2 hours completely controlled the disease. Successful disinfection by formaldehyde was accomplished by saturating the soil with a solution of 1 part 40 per cent formaldehyde to 50 of water, covering for 48 hours, and allowing to stand for 10 days to insure complete evaporation of the formaldehyde. When this method was followed no seed injury resulted. When the disease was starting in flats of seedlings, applying a mixture of 10 parts of lime and 1 of copper sulphate to the soil at the rate of $\frac{1}{2}$ ounce per square foot reduced the average per cent of diseased plants from 44 to 7. [See also Bot. Absts. 11, Entry 1744.]—*E. B. Lambert.*

1745. BISBY, G. R. Stem-rot of sunflowers in Manitoba. Sci. Agric. 2: 58-61. 3 fig. 1921.—During 1920 and 1921 stem rot of *Helianthus annuus* due to *Sclerotinia* sp. (similar to *S. libertiana*) occurred in Manitoba. The disease is characterized by rotting of the stem at the ground and by wilting of the plants. *Iva xanthifolia*, *Cirsium arvense*, *Helianthus tuberosus*, and *Sonchus arvensis* were found to be affected. Similar sclerotia were obtained from parsnips and carrots in 1920.—*B. T. Dickson.*

1746. BOODLE, L. A. Mistletoe on lime-trees. *Kew Bull.* 1921: 212-215. 1921.—The European mistletoe, *Viscum album*, according to Tubeuf, has 3 biologic forms, one of which attacks dicotyledons. The present account discusses the effect of this pathogen upon *Tilia* sp. in England.—*E. Mead Wilcox.*

1747. CARPENTER, C. W. Report of the divisions of plant pathology. *Hawaii Agric. Exp. Sta. Rept.* 1920: 37-40. Pl. 4-6. 1921.—Root rot disease of sugar cane, pineapple, banana, taro, and rice are characterized. Fungi of the *Pythium* type were observed associated with root-rot lesions. Copper sulphate in irrigation water materially increased the yield of marketable taro. Sanitation, pruning, and spraying with Bordeaux reduced the damage to bananas by the banana freckle disease (*Phoma Musae*).—*J. M. Westgate.*

1748. CHAPMAN, G. H. Tobacco investigations. Progress report. Massachusetts Agric. Exp. Sta. Bull. 195. 38 p. 1920.—Diseases are considered only in 1 part of this bulletin, the other parts being concerned with such subjects as effect of weather conditions, cover cropping, fertilizers, etc., on the growth of tobacco.—Sterilization by steam or formaldehyde is recommended for control of damping-off and other seed-bed troubles. In the field *Thielavia basicola*, which causes root rot, is the most important parasite and is responsible for much of the tobacco sick soils. The disease is found to be worse when the soil is only slightly acid (CaO requirement of 4000-8000 pounds) and is not serious in soils which are more acid. Liming the soil thus tends to increase the disease. Soils were treated with various chemicals, but only formaldehyde gave any promise of success. Other diseases mentioned are mosaic, canker, fungus and physiological leaf spots, bud-scald, albinism, hollow stalk, and root rots due to *Fusarium* and *Rhizoctonia*.—*P. J. Anderson.*

1749. CHAPMAN, G. H., and P. J. ANDERSON. Tobacco wildfire. Preliminary report of investigations. Massachusetts Agric. Exp. Sta. Bull. 203. 67-81, pl. 1. 1921.—History of the disease, symptoms, causal organism, dissemination, host relationships, and control measures are discussed. Wounds are not necessary for infection. Wind-blown rain is the most important disseminating agent, but leaf-contact and handling by workmen are partly responsible. Insects seem to have very little influence. All cases found in Massachusetts originated in the seed-bed. Petunia, pokeweed (*Phytolacca*), and tomato were found to be slightly susceptible under favorable conditions. Spraying or dusting with copper fungicides gave good control in the seed-bed. Partial control in the field was secured by roguing and removal of diseased leaves. Other preventive measures are recommended, and a bibliography is appended.—*P. J. Anderson.*

1750. COCKAYNE, A. H. Fireblight and its control. *New Zealand Jour. Agric.* 23: 30-36. 1921.—Experiments have shown that this disease, which occurs only in North Auckland and Auckland Land districts, overwinters in the hawthorne (*Crataegus*) in New Zealand. The complete eradication of this host from all orchard districts is urged. A 5-mile host-free area around the territory of known infection is recommended to stop further spreading. A study of twig infections has shown that the organism may be present 15 inches below any sign of diseased tissue. *Sephena cinera* has been found commonly to transmit the disease. The organism survives for approximately 6 days in honey, and for 9 months in dry bark. The bacillus has lived 2 months in pure distilled water. The injection of chemicals into trees is being tried as a possible means of control.—*N. J. Giddings.*

1751. COOK, MEL. T. Field studies on potato diseases. *Ann. Rept. New Jersey Agric. Exp. Sta.* 41: 573-577. 1920 [1921]. The diseases under consideration were black leg, powdery scab, common scab, scurf, early blight, late blight, dry rot, weather injury, mosaic, and leaf roll. Black leg rarely persists beyond the 1st generation in New Jersey. Crops from seed infected with powdery scab did not show the disease. Corrosive sublimate is better than formaldehyde for the control of scurf. Mosaic and leaf roll plants give a smaller yield than healthy plants.—*Mel. T. Cook.*

1752. COOK, MEL. T. Sunburn and tomato fruit rots. *Phytopathology* 11: 379-380. *Fig. 1-3.* 1921.—The small brownish spots, "freckles," occurring on sunburned tomato (*Lycopersicum esculentum*) fruits are due primarily to a discoloration of the epidermal cells and may increase in size regardless of the presence or absence of organisms. Often these spots are later invaded by species of *Alternaria*.—*B. B. Higgins*.

1753. COTTAM, W. P. A "dry rot" disease of alfalfa roots caused by a *Fusarium*. *Phytopathology* 11: 383. 1921.

1754. COTTON, A. D. Mosaic disease of potatoes. *Jour. Ministry Agric. Great Britain* 28: 335-340. 1921.

1755. DICKSON, B. T. Diseases of the potato. *Sci. Agric.* 2: 55-57, 93-96, 163-167. 1921-1922.—Hopperburn, mosaic, leaf roll, powdery scab (*Spongospora subterranea*), and black leg (*Bacillus atrosepticus*) are discussed.—*B. T. Dickson*.

1756. DORAN, WILLIAM L. Rust of *Antirrhinum*. *Massachusetts Agric. Exp. Sta. Bull.* 202. 39-60, 2 pl. 1921.—The author describes symptoms, history, distribution, causal organism, and control. The teliospore stage is very rare in New England; only the urediniospores are functional. Spores germinate best at 10°C. and a variation of 2° on either side reduces germination by $\frac{1}{2}$; the minimum temperature is 5°, maximum 20°C. Spores live only about 50 days. Freezing does not kill but desiccation shortens the period of viability. Germination of teliospores was not obtained. A test of 46 varieties showed marked differences in susceptibility, the white varieties being highly resistant. Data are presented to indicate that susceptibility varies directly as the number of stomates present on the leaves. Bordeaux mixture and other copper fungicides are ineffective. For control, growing of resistant varieties, keeping water off the foliage, dusting with sulphur, with temperature held at 70°F. and the night temperature above 52°F. or below 48°F. are recommended. A bibliography is appended.—*P. J. Anderson*.

1757. FERDINANDSEN, C., og SØFIE RØSTRUP. *Oversigt over Sygdomme hos Landbrugets og Havelrugets Kulturplanter i 1920.* [Prevailing diseases among garden and field crops in 1920.] *Tidsskr. Planteavl* 27: 697-759. 1921.—This is a discussion of the most damaging plant diseases in oats, barley, wheat, rye, peas, beets, turnips, cabbage, carrots, celery, and potatoes that occurred in Denmark during 1921. Remedial measures are briefly mentioned.—*Albert A. Hansen*.

1758. FOLSON, DONALD. Potato leafroll. *Maine Agric. Exp. Sta. Bull.* 297. 37-52, fig. 28-35. 1921.—This is essentially a summary of a paper already abstracted [see Bot. Absts. 9, Entry 938].—*Donald Folsom*.

1759. FOLSON, DONALD. Potato mosaic. *Maine Agric. Exp. Sta. Bull.* 292. 157-184, fig. 28-30. 1920.—This is largely a summary of papers already abstracted [see Bot. Absts. 3, Entry 2755; 6, Entry 1286].—*Donald Folsom*.

1760. FRANK, ARTHUR. Potato diseases, III. *Rhizoctonia*. *Monthly Bull. Western Washington Exp. Sta.* 8: 160-163. *Fig. 6-9.* 1921.—This is a description of symptoms, effects, and control measures. In experimental work, barnyard manure and complete fertilizer have been of special value in reducing the injury from *Rhizoctonia*.—*F. D. Heald*.

1761. GARMAN, PHILIP. The relation of certain greenhouse pests to a geranium leaf spot. *Maryland Agric. Exp. Sta. Bull.* 239. 25 p., 7 fig. 1920.—The author concludes that: (1) The geranium leaf spot is caused in part by a true fungus parasite, *Cercospora brunkii*. (2) Stigmoneose is caused by several insects, the most common of which are red spider and white fly. The injury caused by them may be distinguished from the spot caused by the fun-

gus. (3) One of the principal means of spreading the *Cercospora* spot is the method of watering. Insects play a small part, if any, in the transmission of the disease. (4) Control may be obtained by Bordeaux mixture applied to stock beds and cuttings. Fungicides other than Bordeaux have proved less successful. (5) Discolored foliage resulting from fungicide applications may be largely avoided if the cuttings are dipped in Bordeaux soon after removal from the stock plants. Plants so treated will grow out of the marks of the application by the time they are ready to ship or set out. (6) Good ventilation should be provided and every precaution taken to prevent excessive humidity or dampness.—*E. C. Auchter.*

1762. GILBERT, W. W. *Sclerotium rolfsii* on velvet beans. *Phytopathology* 11: 278
Fig. 1. 1921.

1763. GÜSSOW, H. T. Leaf curling in tomatoes. *Phytopathology* 11: 380-382. *Fig. 1*
1921.—Curling of the leaves of tomato (*Lycopersicum esculentum*), of the type under discussion, is a distortion brought about by a disturbance in transporting reserve food from leaves to fruit. It occurs only when the vines are heavily pruned.—*B. B. Higgins.*

1764. HOLLRUNG, M. Eine für Deutschland neue Erkrankungsform der Kartoffel. [A potato disease new to Germany.] *Illus. Landw. Zeitg.* 41: 308. 1921.—The author reports finding a species of nematode, considered to be either *Heterodera radicicola* or *H. Schachii*, on the roots of potato in Germany. The disease is described and its possible relation to other nematode diseases discussed. A list of host plants and recommendations for control complete the article. [See also Bot. Absts. 11, Entry 1780.]—*John W. Roberts.*

1765. HOPKINS, E. F. Studies on the *Cercospora* leaf spot of bur clover. *Phytopathology* 11: 311-318. *Pl. 13-14, fig. 1-9.* 1921.—A study of overwintering of *Cercospora medicaginis*, causing a leaf spot of bur clover (*Medicago maculata*), has shown that the most important source of seedling infection is from the hibernating mycelium on the seed coat. This mycelium is not killed by boiling the seed in the hulls 1 minute, as formerly recommended. Treating the hulled seed with formaldehyde solution, 1 pint to 30 gallons of water, for 2 hours, or with mercuric chloride solution, 1:1000, for 2 hours, was effective in destroying the fungus without impairing germination. It is therefore recommended that the seed be hulled, treated with formaldehyde solution, scarified to aid germination, and inoculated with tubercle bacteria before planting.—*B. B. Higgins.*

1766. KÖCK, GUSTAV. Kartoffelkrankheiten im Winterlager. [Potato diseases in storage.] *Oesterreich. Zeitschr. Kartoffelbau* 1: 46-47. 1921.—The author refers particularly to "bacterial ring disease," which can not be detected without cutting tubers, hence can not be eliminated by selection of disease-free stock for storage. Proper storage conditions minimize its danger.—*F. Weiss.*

1767. LYON, C. W. Three major cane diseases: Mosaic, Sereh, and Fiji disease. Exp. Sta. Hawaiian Sugar Planters' Assoc. Bot. Ser. Bull. 3: 1-43. *Frontispiece, pl. 1-4 (colored), fig. 1-27.* 1921.—The Sereh disease is characterized by red gum produced at points in the vascular system, by stunting of the stools, and by adventitious roots arising from the aerial nodes of the stalks. In the Fiji disease pronounced galls are produced in vascular bundles of stems and leaves. Both diseases are infectious. In plants having the Fiji disease a foreign body resembling a plasmodium, found in each diseased cell, is suspected of being the causative agent.—*C. W. Bennett.*

1768. MORSE, F. W., C. P. JONES, B. A. RUDOLF, and H. J. FRANKLIN. Studies of cranberries during storage. *Massachusetts Agric. Exp. Sta. Bull.* 198. 75-92. 1920.—The latter part of this bulletin relates to the study of the fungi causing decay during storage. More than a dozen species of fungi were isolated from the rotted berries, the most important and abundant of which were *Guzignardia Vaccinii* (early rot), *Glomerella cingulata Vaccinii* (bitter rot),

Sporonema Oxyccoci (ripe rot), and *Fusicoccum putrefaciens* (end rot). Data are recorded showing the relative prevalence of the different fungi during the storage period. All but the *Fusconatum* are abundant during the early part of the storage period, becoming less prevalent as the season advances. The reverse is true of *Fusicoccum*, which is worse at the end, rare when storage begins.—P. J. Anderson.

1769. O'BRIEN, D. G. A common disease of potatoes. West of Scotland Agric. Coll. Rept. 1921: 57-72. 22 pl. 1921.—Species of *Rhizoctonia* commonly affect the potato crop of Scotland especially on the "red potato soils." *R. Solani* and *R. crocorum* or *R. violacea* occur with about equal frequency. The latter is thought to cause the greater injury. The disease is most common in acid soils. [The above paper was also issued as West of Scotland Agric. Coll. Bull. 94. 1919.]—H. V. Harlan.

1770. OSMUN, A. V. Report of the department of botany. Ann. Rept. Massachusetts Agric. Exp. Sta. 32: 13a-17a. 1920.—This includes brief mention of the work in progress in the Department during 1919, and short notes on some diseases of the year. Root and stem rots of peas and beans, mosaic of potatoes, *Phoma* disease of potatoes, late blight of potatoes, and a number of diseases of fruit trees are noted.—P. J. Anderson.

1771. OSMUN, A. V. Report of the department of botany. Ann. Rept. Massachusetts Agric. Exp. Sta. 33: 19a-22a. 1921.—Notes on tobacco wildfire (*Bacterium tabacum*), tomato leaf spot (*Septoria Lycopersici*), a new carrot disease, *Verticillium* wilt of eggplant, late blight of potatoes (*Phytophthora infestans*), and apple scab (*Venturia inaequalis*) are given.—P. J. Anderson.

1772. REINKING, OTTO A. Fiji disease of sugar cane in the Philippine Islands. Phytopathology 11: 334-337. Pl. 15-16. 1921.—Fiji disease of sugar cane, which has been present in the Philippine Islands for several years, is very destructive in some plantations. Badly diseased plants are characterized by a shortening of the internodes, resulting in a stunted plant with crowded upright leaves; by the production of an excessive number of shoots; by the darker green color of the leaves; and by the blister-like galls on the under surface of the leaves. Plants less severely attacked may appear almost normal. The cause of the disease is unknown. Some native varieties of cane appear to be decidedly resistant.—B. B. Higgins.

1773. ROBBINS, W. W. Mosaic disease of sugar beets. Phytopathology 11: 349-365. Fig. 1-8. 1921.—A mosaic disease of sugar beets has been found in the irrigated areas of Colorado in annually increasing amounts since 1917. The diseased plants are characterized by a mottling which may or may not be accompanied by a distortion of the leaf. In a cross section of a diseased leaf there is an evident darkening of the vascular tissue and of adjacent cells. A yellowish or reddish-brown precipitate is found in the phloem cells and occasionally in other elements of the bundle, as well as in the parenchyma cells bordering the bundle and in the intercellular spaces. There is also an abnormal accumulation of starch in the leaves in an advanced stage of infection. The disease was carried from diseased to healthy beets by aphids (*Myzus persicae*), but all attempts to transfer the disease artificially,—by injecting juice expressed from healthy plants into the leaves or crowns of healthy plants, or by inserting bits of diseased tissue into healthy plants,—have failed. Apparently the disease is not carried by the beet seed. It is carried over winter in the stored roots which are saved for seed growing.—B. B. Higgins.

1774. ROBERTS, JOHN W. Plum blotch, a disease of the Japanese plum, caused by *Phyllosticta congesta* Heald and Wolf. Jour. Agric. Res. 22: 365-370. Pl. 34, 2 fig. 1921.—The disease is known from Georgia [U. S. A.] and occurs on leaf and fruit of *Prunus triflora*, varieties Abundance and Burbank. The lesions are similar to those on apple caused by *Phyllosticta solitaria*. *P. congesta* and *P. solitaria* are alike in morphology but in tests the former infected plum whereas the latter did not. No attempts have been made to control the disease because plum culture has been abandoned in Georgia.—D. Reddick.

1775. RUMBOLD, CAROLINE, and ELIZABETH K. TISDALE. Notes on *Phoma insidiosa* Tass. found on Sudan grass. *Phytopathology* 11: 345. 1921.—*Phoma insidiosa*, apparently identical with the form recently reported on grain sorghums, has been found producing brownish-drab colored spots on Sudan grass (*Holchus sorghum sudanensis*).—B. B. Higgins.

1776. SIMONETTO, Moisés. La enfermedad de las rayas amarillas en la caña (su importación y extensión—año y medio de observaciones en Cuba.) [The yellow-stripe disease in cane (its importation and extension—one and a half years' observations in Cuba).] Bol. Oficina Sanidad Veg. Secretaria Agric. Com. y Trab [Cuba] 3: 1-63. 8 fig., 8 maps. 1921.—This paper includes a general account of the yellow-stripe or mosaic disease of sugar cane, specific information relative to its distribution and behavior in Cuba. The disease is shown to be present in several localities in each of the provinces of Hayana, Santa Clara, Camagüey, and Oriente. Among recommendations made under "General Control Measures" are the following: (1) That the Cuban Government introduce a certain quantity of cane seed immune to mosaic from Louisiana and Porto Rico; (2) that field tests on a large scale be made of the following varieties—"Uba of Natal (Kavangire)," "Cayana (Japanese)," and "Zwings;" (3) that 7 pieces of government land be set apart for the cultivation of the introduced canes, thus creating a producing center for cane in each province, under the control of the Office of Plant Sanitation; (4) that there be distributed free to the planters certain quantities of the canes as a substitute for the variety "Crystalina."—The author also recommends the planting of "morada" (purple) cane, as this variety appears more resistant to the disease than the "Crystalina." The eradication of diseased stools in fields where the infection is not greater than 8 per cent and the treatment of seed are recommended.—S. C. Bruner.

1777. SMALL, W. A wilt of carnations, *Nigella*, *Delphinium*, and *Cosmos*, with a note on *Sclerotium Rolfsii*. *Kew Bull.* 1920: 321-328. Fig. 1-4. 1920.—A wilt disease caused by a species of *Fusarium* is briefly described. Cross inoculations between the plants mentioned were successful. *Sclerotium Rolfsii* was found on a single wilted carnation plant.—E. Mead Wilcox.

1778. TURRILL, W. B. *Arceuthobium Oxycedri* and its distribution. *Kew Bull.* 1920: 264-268. 1920.—This pathogen commonly attacks species of *Juniperus* in the Mediterranean region.—E. Mead Wilcox.

1779. WAKEFIELD, E. M. Diseases of the oil palm in West Africa. *Kew Bull.* 1920: 308. 1 pl. 1920.—A trunk rot caused by *Ganoderma lucidum* and a bud rot somewhat similar to the bud rot of the coconut palm are described. Dissemination of the *Ganoderma* spores may be accomplished by the borer *Oryctes owariensis*.—E. Mead Wilcox.

1780. ZIMMERMANN, HANS. Nematodenbefall (Heterodera) an Kartoffeln. [Nematode attacks on potatoes.] Illus. Landw. Zeitg. 41: 331-332. 1921.—The author calls attention to the fact that Hollrung [see Bot. Absts. 11, Entry 1764] was in error in considering the nematode disease of potato new to Germany, and cites his own publications on the subject. The disease, to which no varieties are resistant, is described. Control measures are discussed with the recommendation that nematode-free soil be used and locations either moist or adjoining moist areas avoided.—John W. Roberts.

ERADICATION AND CONTROL MEASURES

1781. ANONYMOUS. Consigli pratici per il mese di Luglio. [Control measures recommended for the month of July.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 6: 1-2. 1920.—Directions are given for the proper fungicides to be used at this season for grapes, peppers, tomatoes, beans, peas, cucumbers, cantaloupes, watermelons, pumpkins, and potatoes.—Edith K. Cash.

1782. ANONYMOUS. Steaming the tobacco field. *Sci. Amer.* 125: 83. 1 fig. 1921.—The apparatus used in sterilizing tobacco seed beds is described.—*Chas. H. Otis.*

1783. BEWLEY, W. F. Control of "damping off" and "foot rot" of tomatoes. *Jour. Ministry Agric. Great Britain* 28: 653-654. 1921.—An effective remedy for checking the spread of damping off and foot rot of tomatoes and other seedlings in seed boxes and seed beds consists in treating the soil with a solution of copper sulphate and ammonium carbonate prepared by thoroughly mixing 2 ounces of finely powdered copper sulphate and 11 of ammonium carbonate, storing for not less than 24 hours in a tightly corked glass or stone jar, and then dissolving 1 ounce of this dry mixture in a little hot water and making up to 2 gallons with water. Vessels of iron, tin, or zinc should not be used as they are corroded by this solution, causing a rapid loss of strength of the solution. The solution may be used to prevent damping off by thoroughly watering the soil with it after the seed are planted and covered. Generally a pint per box ($14 \times 9 \times 2$ inches) is sufficient. Seedlings transplanted into contaminated soil may be effectively protected by watering with the solution as soon as they are set. If the disease appears each plant should be removed as it is attacked, the hole watered with 1 pint of the solution, a healthy plant inserted and watered with the solution. [See also *Bot. Absts.* II, Entry 1744.]—*M. B. McKay.*

1784. BIRMINGHAM, W. A. The detection of crown gall before planting. *Agric. Gaz. New South Wales* 32: 901-903. 8 fig. 1921.—Practical suggestions are given.—*L. R. Waldron.*

1785. BUTLER, O. R. Spraying for late blight of potatoes. *New Hampshire Agric. Exp. Sta. Circ.* 22. 6 p. 1920.—Bordeaux mixture 8-4-50 applied every 14 days gave better control than Bordeaux of a 4-4-50 or 4-2-50 formula applied every 7 days.—*G. F. Potter.*

1786. CERASOLI, ERCOLE. Il problema nazionale degli anticrittogamici a base de rame. [The national problem of the copper fungicides.] *Boll. Mens. R. Staz. Patol. Veg.* 2: 64-71. 1921.—Bordeaux mixture ought to disappear in practice because it is inconvenient and wasteful. Bordeaux mixture containing 25 per cent copper is no more effective than "polvere caffaro" (powdered copper oxychlorid) or powdered Bordeaux containing only 15 per cent copper. "Caffaro" in paste form is inconvenient. Pastes and mixtures may be replaced completely by impalpable powders. Specific directions for the preparation of oxychlorid powder and for dry Bordeaux are given. The latter is less expensive, and has given good results in the vineyards of Arpino.—*D. Reddick.*

1787. CLARK, ROBERT M. Cost of orchard spraying. *Iowa State Hort Soc. Rept.* 55: 240-242. 1920 [1921].—Figures are given on the cost of spraying 3,000 18-year old apple trees on a 60-acre orchard. A large 10-horse-power Nu Sytm Friend sprayer, with 300-gallon tank, and capable of delivering 15 gallons per minute through 2 spray guns at 300 pounds pressure, was used; 50,000 gallons of spray were applied during the season. The cost was 42 cents per acre.—*R. J. Haskell.*

1788. CLAUS, EUGEN. Versuche mit dem Kartoffelkonservierungsmittel Uspulunbolus. Experiments with Uspulunbolus.] *Oesterreich. Zeitschr. Kartoffelbau* 1: 41-42. 1921.—Treatment of potatoes in storage with Uspulunbolus at rate of 1 kgm. to 100 kgm. of potatoes did not prevent a slight development of rot, but stimulated germination. A planting test of treated and untreated tubers of the same lots showed an average increase of 16 per cent in yield of treated seed.—*F. Weiss.*

1789. COCKAYNE, A. H., and G. H. CUNNINGHAM. Lemon brown rot and its control. *New Zealand Jour. Agric.* 22: 271-274. 1921.—This disease, first reported in New Zealand in 1907, and now quite general, is not likely to prove serious if reasonable control measures are adopted.—*N. J. Giddings.*

1790. DALLAS, W. K. Black spot of the pear and apple. New Zealand Jour. Agric. 22: 369-371. 1921.—Several spray materials were tested, and all appeared to give good control.—*N. J. Giddings.*

1791. DALMASSO, G., e S. SUTTO. Prove di rimedi contre le crittogramma della vite. [A test of remedies for fungus diseases of the grape.] Il Coltivatore 67: 364-368, 395-399. 1921.—As a result of comparative tests in the control of mildews (*Peronospora* and *Oidium*) of grape the following conclusions are reached: (1) Bordeaux mixture whether neutral, acid, or basic gave best results against *Peronospora*; (2) 1 per cent Bordeaux mixture is as effective as stronger mixtures; (3) gelatin as an adhesive is not necessary; (4) powdered "caffaro" (cupric oxychlorid) in 1 per cent strength is slightly inferior to Bordeaux mixture; (5) lime-sulphur (supersolfo) solution, as used, did not give satisfactory control of powdery mildew, but more tests should be made; (6) treatment with dry preparations alone are not sufficient for the control of *Peronospora* in rainy sections.—*D. Reddick.*

1792. DeONG, E. R. Selection and treatment of waters for spraying purposes with special reference to Santa Clara Valley. California Agric. Exp. Sta. Bull. 338. 301-314. 1921.—Hard water, which is common, forms dangerous combinations with or destroys the efficiency of many forms of insecticides. Softening hard waters with caustic soda or other water softeners is not completely successful in all cases, and hauling soft water from a distance in quantities sufficient for spray purposes is frequently impracticable. Surface waters are usually softer than underground supplies, but storage of the former during rainy seasons is possible only in limited areas. Water-softening plants with a sufficient capacity for supplying a spraying outfit and also meeting domestic needs may be installed at a cost of a few hundred dollars. The use of dusting materials for certain cases, in place of liquid sprays, is advantageous in that the user is independent of water. Insecticides, comparable with the soluble salts commonly found in waters, are desirable and may be a satisfactory solution of the difficulty in some instances. Water containing chlorine at the rate of 20 parts per million or more has been reported as dangerous for use with acid arsenate of lead, a soluble form of arsenate being formed which may cause severe foliage injury. Basic arsenate of lead should be substituted for acid if used with very hard or alkaline waters. California waters have an unusually high chlorine content, which may account for cases of arsenical injury that have occurred where acid arsenate of lead has been used.—*A. R. C. Haas.*

1793. DOWNING, R. G. Home-made Bordeaux v. powders and paste. Agric. Gaz. New South Wales 32: 894. 1921.—Trials have shown that home-made Bordeaux is more dependable than trade preparations for the control of downy mildew and black spot of grape.—*L. R. Waldron.*

1794. EASTHAM, J. W. Apple scab control. British Columbia Fruit Growers Assoc. Ann. Rept. 31: 58-59. 1920.—[See Bot. Absts. 9, Entry 432.]

1795. FRANKLIN, H. J. Report of the cranberry sub-station from 1917 to 1919. Massachusetts Agric. Exp. Sta. Bull. 192. 106-141. 1919.—Extensive experimental data on control of fungus diseases and insect pests are given. The best method for control of "rose bloom" (*Exobasidium Ozyococcii*) proved to be flooding the bogs at the proper time. Experiments were conducted to determine the effect of various conditions on keeping qualities of berries in storage. Raising the temperature during storage increases the amount of softening; changing the humidity of the air had no effect on decay; ventilation decreased decay; storing under water was unsatisfactory; berries stored when dry kept better than those which were wet; admixture of cranberry leaves in the crates improved keeping; admixture of decayed berries made others rot more quickly; shipping in chaff diminished the amount of decay.—*P. J. Anderson.*

1796. GRAHAM, J. J. T. Report on insecticides and fungicides. *Jour. Assoc. Official Agric. Chem.* 5: 33-50. 1921.—This is a report of a study of methods for determining arsenic, calcium, zinc, lead, and copper in chemicals used in spraying.—*F. M. Schertz.*

1797. GRUBB, NORMAN H. Tests of fungicides on apple trees. *Jour. Pomol.* 2: 93-114. Fig. 19. 1921.—This is a detailed account of 2 years' experiments in spraying young apple trees with various fungicides to test comparative value, fungicidal power, and extent of injury to foliage and fruit of different varieties. Bordeaux mixture, lime sulphur, and ammonium polysulphide proved effective in apple-scab (*Venturia inaequalis*) control in the order named. Injury resulted from Bordeaux, even with an excess of lime. Lime-sulphur reduced the crop in comparison with Bordeaux or with the checks. Trees sprayed with ammonium polysulphide bore more than double the crop sprayed with lime-sulphur. Ammonium polysulphide with soap was more effective in controlling apple mildew (*Podosphaera leucotricha*) than other fungicides tested. Summer spraying with fungicides reduced the loss of fruit by brown rot (*Sclerotinia fructigena*) and the bud infections of canker (*Nectria ditissima*).—*L. H. MacDaniels.*

1798. HEALD, F. D., and G. L. ZUNDEL. The control of cereal smuts in Washington. *Washington State Ext. Serv. Bull.* 72. 21 p., 8 fig. 1921.—A general consideration of cereal smuts is followed by a tabulation of species present in Washington, with recommendations for their control. Neither loose smut of wheat nor loose smut of barley are present in sufficient amount to justify seed treatment. Most control practices recommended for the other smuts have been generally used. Special note may be made of the use of the lime bath in lessening seed injury following formaldehyde treatments, and the use of copper carbonate dust for treatment of wheat for huit, or stinking smut.—*F. D. Heald.*

1799. HERRICK, R. S. The 1920 results of spraying in the apple grove orchard, Mitchellville, Iowa. *Iowa State Hort. Soc. Rept.* 55: 244-248. 1920 [1921].—The effectiveness of B. T. S. of the General Chemical Co., Sherwin-Williams dry lime-sulphur, Rex liquid lime-sulphur, and home-made Bordeaux for control of apple scab, blotch, and codling moth was tested in an orchard of Northwestern Greenings and Ben Davis. All reduced scab materially, but the 1st 2 did not satisfactorily control blotch under the conditions of the experiment. Average amount of spray applied to each tree and average cost of materials and labor are given.—*R. J. Haskell.*

1800. HOLLAND, E. B., A. I. BOURNE, and P. J. ANDERSON. Insecticides and fungicides for farm and orchard crops of Massachusetts. *Massachusetts Agric. Exp. Sta. Bull.* 201. 37 p. 1921.—This general bulletin on the development, composition, qualities, and uses of fungicides and insecticides includes tables showing standard formulas for application, a diagram showing safe and dangerous mixtures of materials, a table showing the guarantees of many proprietary preparations, and a bibliography.—*P. J. Anderson.*

1801. HOWARD, C. W. Control of eelworm in tomato houses. *New Zealand Jour. Agric.* 23: 225-227. 1921.—Soil treatment with carbon disulphide (0.5 gm. per 100 square inches of soil surface) was found quite effective. Carbolic acid was also effective, but had a very injurious effect on the plants unless applied 10 or 12 weeks before planting. Treatments during 2 seasons are required to thoroughly clean up eel worm infestation.—*N. J. Giddings.*

1802. HOWITT, J. E. Experiments in the control of *Rhizoctonia* or black scurf of potatoes. *Sci. Agric.* 1: 253. 1921.—Results in 1920 showed that treating tubers with sclerotia for 2 hours in corrosive sublimate 1 : 500 gave perfect control, and that 1 : 1000 for 2 hours reduced the number of disfigured tubers to 14 per cent.—*B. T. Dickson.*

1803. HUNTER, W. T. Control of fire-blight in the Okanagan Valley. *Agric. Jour. [British Columbia]* 6: 241. 1921.—This summary of practical recommendations for blight control emphasizes the destruction of diseased parts in the fall. A new feature is the use of a certificate giving a clean bill of health, so far as fire-blight is concerned, to orchard owners doing careful eradication work.—*J. W. Eastham.*

1804. LAUBE, W. *Das Beizen des Roggens gegen Fusarium.* [Seed treatment of rye for control of Fusarium.] Illus. Landw. Zeitg. 41: 329-330. 1921.—The seriousness of the disease is stated and recommendations for its control are given. By treatment with a solution of "Uspulum," a proprietary compound, excellent results were obtained. A table showing the results obtained by varying the strength of the solution and the time of treatment is given. "Fusarioil," another proprietary preparation, is also mentioned as an efficient fungicide. A supplementary control measure consists in shallow drilling in wide rows.—John W. Roberts.

1805. LOCHHEAN, W. The story of spraying mixtures. Ann. Rept. Quebec Soc. Protection of Plants 13: 12-19. 1921.—[See Bot. Absts. 10, Entry 235.]

1806. MAHEUX, G. Some methods of seed treatment. Ann. Rept. Quebec Soc. Protection of Plants 13: 47-50. 1921.—This review of the methods in common use is arranged on a crop basis.—B. T. Dickson.

1807. MANEY, T. J. Spraying failures and successes. Iowa State Hort. Soc. Rept. 35: 91-95. 1920 [1921].—The author points out that much of the spraying in southwestern Iowa and southern Nebraska is a failure and states that 40-50 per cent of the fruit in sprayed orchards was scabby or wormy in 1920. The reasons for the failure are lack of knowledge regarding equipment, materials, diseases, insects, and spraying methods.—R. J. Haskell.

1808. MARLATT, C. L. Quarantine laws and regulations, state and national. Proc. Amer. Pomol. Soc. 1920: 67-74. 1921.—This brief history of the efforts leading up to, and the passing of, the Plant Quarantine Act includes an explanation of the act and the progress made in its administration.—W. E. Whitehouse.

1809. MARTIN, WM. H. Report of potato spraying tests. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 577-587. 1920 [1921].—With Irish Cobhier varieties 5 applications of home-made Bordeaux mixture gave an increase of 49.6 bushels as compared with an increase of 50.6 bushels for a commercial zinc-Bordeaux. The increase resulted from the control of early blight and tip burn. Negative results were obtained with the American Giant variety. Five applications of Bordeaux mixture gave a yield of 228.3 bushels per acre as compared with 262.8 bushels for plots sprayed with arsenate of lead. Four applications of Bordeaux mixture on late crop Irish Cobblers gave an increase of 50.8 bushels over adjoining unsprayed plots; late blight was a factor in this test. An examination of sprayed and unsprayed plots on Oct. 21 showed all of the unsprayed plants dead whereas only 3 per cent of the leaves in the sprayed plants were dead.—Mel. T. Cook.

1810. MARTIN, WM. H. Seed treatment for the control of potato scab. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 587-590. 1920 [1921].—Scabby seed treated with mercuric chloride or formaldehyde gave a better stand and yield than untreated scabby seed. Dipping and sprinkling were tried with each solution. Seeds were dipped 15 minutes, 30 minutes, and 1 hour. The 30-minute formaldehyde and the 15-minute mercuric chloride treatments gave a greater increase in salable prime tubers than either of the 1-hour treatments, whereas the 1-hour treatment with either solution gave slightly better control of scab than the shorter treatments. Sprinkling and the 15-minute treatment decreased the amount of scab.—M. T. Cook.

1811. MASSEY, L. M. Report of progress in demonstration on the control of diseases of potatoes, sweet potatoes, truck crops, forage crops, and related plants in New Jersey. Ann. Rept. New Jersey Agric. Exp. Sta. 40: 535-544. 1919 [1920].—This is a report of the work of the extension specialist on cooperative work between the office of Cotton, Truck and Forage Crop Disease Investigations of the U. S. Department of Agriculture and the New Jersey State College of Agriculture. This involved spraying of potatoes and tomatoes and demonstrations of methods for the control of the stem rot and other diseases of sweet potato. The results are inconclusive.—Mel. T. Cook.

1812. McALPINE, D. Bitter pit in apples and pears: latest results in preventive measures. *Phytopathology* 11: 366-370. 1921.—This paper reports investigations on preventing bitter pit in storage and in the orchard. The methods recommended for prevention in storage are now successfully used in cold storage houses and in shipments of apples and pears from Australia to Europe. In fruit stored at 30-32°C., and held within these limits, bitter pit does not develop. In the orchard during the growing season high humidity, following a period of drought, together with fluctuating temperature causes certain elements of the vascular system and the neighboring pulp cells just under the skin of the fruit to rupture. The ruptured cells then collapse, die, and turn brown. In a climate subject to these sudden changes in temperature and humidity the most promising methods of combatting the disease are breeding and selecting pit-proof varieties and selecting stocks suited to the variety and to the climatic and soil conditions.—*B. B. Higgins.*

1813. NICHOLS, H. E. What the orchard spraying campaign has taught us. *Rept. Iowa State Hort. Soc.* 55: 238-240. 1920.—Spraying was done in 19 counties and good results obtained in all. The average sprayed tree produced twice as much fruit as the unsprayed. On the sprayed trees 66 per cent of the fruit was clean, on the unsprayed only 12.3 per cent. The apple blotch is spreading northward, being most destructive on Northwestern Greening. —*L. H. Pammel.*

1814. NISIKADO, YOSIKAZU, and MIYAKA CHUICHI. Treatment of the rice seeds for *Helminthosporiose*. I. Hot water treatment. *Ber. Ohara Inst. Landw. Forsch.* 1: 543-555. 1920.—A series of experiments to eliminate *Helminthosporium Oryzae* from rice seed by the hot water treatment gave the following results: The thermal death point of the ungerminated spores lies between 50 and 52°C.; of the germinated between 48 and 50°C. The optimum temperature for spore formation lies between 25 and 30°C. It is recommended that rice seed be treated with water at 53°C. for 10 minutes or 54°C. for 5 minutes after the seed has been soaked for 1 day in water at the temperature prevailing during the sowing season.—*F. F. Halma.*

1815. PETCH, C. Spraying vs. dusting. *Ann. Rept. Quebec Soc. Protection of Plants* 13: 68-72. 1921.—[See Bot. Absts., 10 Entry 288.]

1816. PORTER, R. II. Potato seed treatment in Mitchell County, 1919. *Rept. Iowa State Hort. Soc.* 54: 306-307. 1919 [1920].—In a seed-treatment campaign conducted in Mitchell County, Iowa, the "hot formaldehyde treatment" was used, with good results. The tubers were soaked for about 2½ minutes in formaldehyde (2 pints to 30 gallons water) at a temperature of 118-122°F., covered for an hour, and cut before planting.—*Jessie Wood.*

1817. RIEHM, E. Ueber das Beizen des Getreides. [On seed treatment of grains.] *Illus. Landw. Zeitg.* 41: 330. 6 fig. 1921.—In this brief popular article a paragraph is given to the treatment of each disease.—*John W. Roberts.*

1818. RIEHM, E. Wie bekämpft man den Schneeschimmel? [How is the snow mold combated?] *Mitteil. Deutsch. Landw. Ges.* 36: 519-520. 1921.—The author calls attention to the danger from *Fusarium nivale*, which is carried to fields in seed and develops on the young plants under the snow, leaving dead plants commonly charged to winter-killing. Treatment of the seed with Fusariol or Uspulun, and thin and late seeding, are recommended.—*A. J. Pieters.*

1819. ROOT, GEORGE A. White pine blister work in Oregon. *Ann. Rept. Oregon State Hort. Soc.* 12: 52-56. 1921.—To protect the large tracts of western white pine (*Pinus monticola*), sugar pine (*P. lambertiana*), and white-bark pine (*P. albicaulis*) against the danger of importation of white pine blister rust (*Cronartium ribicola*), rigid state and federal quarantine laws are in effect in Oregon. They prohibit the importation of 5-needed pines, and of currants and gooseberries, into the state from the eastern U. S. A. and all foreign countries.—*A. E. Murneek.*

1820. RUMMELS, J. O. *My experience with cabbage disease.* Rept. Iowa State Hort. Soc. 54: 292-293. 1919 [1920].—In 1913 *Fusarium* wilt appeared in the author's 200-acre cabbage field near Nichols, Iowa, but did not cause much loss. In 1914 the crop on the same field was a complete failure, due to the disease. In 1915 and 1916 new land gave good crops, but *Fusarium* and *Phoma* appeared during the latter season. In 1917 and 1918 corn and oats were grown on this new land, and cabbage planted again in 1919, when *Fusarium* and *Phoma* wilts caused a complete loss. Experiments conducted during 1915 on the old cabbage-sick field proved that immune cabbage could be grown successfully, but the variety used was too late for that locality. Hot-hed soil should be sterilized each year.—*Jessie Wood.*

1821. SALMON, E. S. *Hop—"mould" and its control. II.* Jour. Ministry Agric. Great Britain 28: 260-263. 1921.

1822. SANDERS, G. E., and A. KELSELL. *Dusts and dusting for insect and fungus control.* Sci. Agric. 2: 7-14. 1921.—This article deals with dusts containing arsenic and copper. The fungicidal ingredient is monohydrated copper sulphate and the insecticidal, calcium arsenite. For apples a dust made of 10 pounds dehydrated copper sulphate, 5 of calcium arsenite, and 85 of hydrated lime was used. For 1 acre of orchard 55 pounds were required as against 73 pounds 90-10 sulphur-lead arsenate dust and 150 gallons of spray.—*B. T. Dickson.*

1823. SMITH, LOREN B. *Control of spinach leaf mold (downy mildew) by spraying.* Quart. Bull. Virginia Crop Pest Commission 3: 4. 1921.—Copper soap, Bordeaux soap, and Bordeaux mixture were applied to $\frac{1}{5}$ -acre plots on October 22 and 30. The copper soap, containing $\frac{1}{2}$ pound of copper sulphate and 5 pounds of caustic-potash fish-oil soap in 50 gallons of water, gave best results. The plot sprayed with this material showed 72 per cent of the plants affected with downy mildew as compared with 100 and 98 per cent for the checks, and an average number of infections per plant of 9.1 as compared with 21.1 and 16 for the checks. The checks were so yellowed as to be unfit for cutting and the leaves were ragged from the destruction of tissue by the fungus, whereas that from the copper-soap plot showed but little yellowing, and the harvested crop was in prime condition.—*F. D. Fromme.*

1824. SMITH, RALPH. *The preparation of nicotine dust as an insecticide.* California Agric. Exp. Sta. Bull. 336. 261-274. 1921.—Kaolin was placed in large pans and the proper amount of "Black Leaf 40" (2 per cent for walnut aphid dust) sprinkled over it without adding water. This was mixed and raked, allowed to dry over night, then sifted and mixed. By starting with pulverized kaolin and using no moisture except that contained in the "Black Leaf 40" the lumps formed are very soft and easily broken by using a heavy 45-mesh screen in the sifter. Difficulties have been experienced in obtaining the desired dryness, fineness, and uniformity without loss of nicotine, although these have now been largely overcome. Combinations with nicotine dust, its uses, and properties are described.—*A. R. C. Haas.*

1825. TRACY, F. E. *Methods of treating seed potatoes in Mitchell County.* Rept. Iowa State Hort. Soc. 54 (1919): 307-309. 1919 [1920].—The author describes various ways of heating the formaldehyde solution for the hot formaldehyde treatment. Care must be taken to maintain the temperature at the proper point and to dip for the proper length of time. Treated seed should be planted on clean land. It is better to plant clean seed, which should be treated unless it is from certified fields, than treated scabby seed. This method controls black scurf as well as scaf, and requires only 2 minutes' dipping instead of 2 hours as in the old treatment.—*Jessie Wood.*

1826. TRAVERSO, G. B. *Cenni su l'industria degli anticrittogamici e degli insetticidi in Italia.* [The fungicide and insecticide industry in Italy.] Boll. Mens. R. Staz. Patol. Veg. 2: 51-63. 1921.—Information is given about the insecticides and fungicides produced in Italy, with names of manufacturers, quantities produced, and their uses. The following substances are included: copper sulphate, oxychloride of copper ("caffaro"), powdered Bor-

deaux mixture, sulphur, sulphur-copper sulphate mixture, lime-sulphur, tobacco powder and extract, lead arsenate, sodium arsenite, zinc phosphate, carbon bisulfide, coal and wood tar, and hydrocyanic acid.—*D. Reddick.*

1827. VOGLINO, P. Consigli pratici per il mese di Marzo. [Control measures recommended for the month of March.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 2: 1-2. 1920.—Seed wheat for March sowing should be sprinkled with a 2 per cent solution of copper sulphate. In regard to the substitution of impure for refined sulphur as a fungicide, the Ministry of Agriculture advises that the efficacy of sulphur depends less on its purity than on the degree of fineness.—*Edith K. Cash.*

1828. VOGLINO, P. Consigli pratici per il mese di Maggio. [Control measures recommended for the month of May.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 4: 1-2, 1920.—Grapevines should be sprayed with a 3-5 per cent copper sulphate solution as a preventive against *Peronospora*. Preventive sprays for fruit, ornamentals, and vegetables are also suggested.—*Edith K. Cash.*

1829. VOGLINO, P. Consigli pratici per il mese di Guigno. [Control measures recommended for the month of June.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 5: 1-2. 1920.—Directions are given for protecting various fruits and vegetables against attacks by fungi.—*Edith K. Cash.*

1830. VOGLINO, P. Consigli pratici per il mese di Agosto. [Control measures recommended for the month of August.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 7: 1-2. 1920.—A 5-10 per cent copper sulphate solution for grape *Peronospora* and *Oidium*, a spray for fruit trees to guard against *Monilia*, and a Bordeaux spray for cucurbitaceous and solanaceous garden crops are advised.—*Edith K. Cash.*

1831. VOGLINO, P. Consigli pratici per il mese di Settembre. [Control measures recommended for the month of September.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 8: 1-2. 1920.—Recommendations are made for the control of mould on grape (*Botrytis cinerea*), *Sclerotinia fructigena* on fruits, *Peronospora*, *Phytophthora*, *Macrosporium*, and *Septoria* on various garden vegetables.—*Edith K. Cash.*

1832. VOGLINO, P. Consigli pratici per il mese di Ottobre. [Control measures recommended for the month of October.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 9: 1-2. 1920.—General advice is given to fruit-growers, farmers, gardeners, and vine-growers.—*Edith K. Cash.*

1833. VOGLINO, P. Consigli pratici per il mese di Novembre. [Control measures recommended for the month of November.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 10: 1-3. 1920.—Recommendations are given for proper storing of vegetables to avoid storage rots and for selecting beans free from anthracnose for use as seed.—*Edith K. Cash.*

1834. WECK, R. Zur Beiztechnik. [On the technic of steeping seed.] Illus. Landw. Zeitg. 41: 410-411. 1 fig. 1921.—Apparatus for treating seed with fungicides is described and directions are given for use in the control of various diseases.—*John W. Roberts.*

1835. WHITE, E. W. An apple opportunity. Agric. Jour. [British Columbia] 6: 148-149. 1 fig. 1921.—This is a summary of results of experiments in fall spraying for apple-tree anthracnose (*Neofabraea malicorticis*). On early varieties 1 spraying with 3-4-40 Bordeaux as soon as the fruit is picked is sufficient. With late varieties 1 spraying with 3-4-40 Bordeaux the last week in August is effective. With varieties such as King and Jonathan, spraying with 1-1-40 Burgundy the last week in August followed by 3-4-40 Bordeaux immediately after picking is required.—*J. W. Eastham.*

1836. WHITEHEAD, T. Experiments on the control of onion smut. Jour. Ministry Agric. Great Britain 28: 443-450. 1921.—Tests were made of the efficacy of seed and soil treatments for the control of onion smut (*Urocystis cepulae*) in contaminated soil. Some of the materials used were sulphur, huilder's lime, calcium cyanamide, formaldehyde, paraform, soot and salt, sulphuric acid, bleaching powder, lime, and carbon bisulphide. Best results were secured from the use of formaldehyde applied to the open drill rows.—*M. B. McKay.*

REGULATORY MEASURES

1837. ANONYMOUS. The destructive-insects-and-pests order of 1921. Gard. Chron. 70: 41. 1921.—This order prohibits the landing in England or Wales of specified plants from foreign countries unless accompanied by certificate of inspection from an officer of a recognized plant-inspection service of the country from which they are shipped. Plants from countries with no inspection service may be passed if free from disease. Otherwise they are disinfected, destroyed, or returned. A list of fungi and insects to be excluded is given.—*P. L. Ricker.*

1838. ALCOCK, MRS. N. L. Protection against fungi from abroad. Jour. Ministry Agric. Great Britain 28: 655-659. 5 fig. 1921.

1839. ALLEN, R. H. Seventeenth annual report of the state nursery inspector. Ann. Rept. Massachusetts State Dept. Agric. 1: 73, 85. 1919.—This includes a report on eradication of *Ribes* for the control of white pine blister rust. No further attempts are to be made to destroy all the *Ribes* in the state, but 4 areas, including 12 towns, where the pine is especially valuable, have been selected as control areas and an attempt is being made to keep all *Ribes* out of these areas. Data are presented showing the number of plants removed in each of 5 towns, the method of scouting, and the cost.—*P. J. Anderson.*

1840. SCHOENE, W. J. Report of inspection work during autumn of 1920 and spring of 1921. Quart. Bull. Virginia Crop Pest Commission 3²: 2. 1921.—A tabular statement of the inspection of apple stocks during the period of the report shows the number of trees discarded on account of crown gall to be 139 out of 1822 (7.6 per cent) from nurseries within the state, and 6,933 out of 161,997 (4.3 per cent) from nurseries in other states. The percentage of trees affected with crown gall in different lots varied from 0 to 22.4.—*F. D. Fromme.*

1841. SCHOENE, W. J. Thirteenth report of the State entomologist and plant pathologist. Quart. Bull. Virginia Crop Pest Commission 3⁴: 30. 1922.—Matter relating to plant diseases is arranged under the following heads: sweet potato situation in Virginia; maple wilt; reported discovery of take-all disease of wheat in Virginia; eradication of cedar rust by the removal of cedar trees. A table showing petitions filed for the removal of cedars since the enactment of the State law is appended. The total acreage involved in these petitions is 20,155.—*F. D. Fromme.*

MISCELLANEOUS (COGNATE RESEARCHES; TECHNIQUE, ETC.)

1842. ANONYMOUS. Summer meeting of the American Phytopathological Society. Phytopathology 11: 376-377. 1921.—This is a brief account of the meeting, held in conjunction with the Conference of Cereal Pathologists at St. Paul, Minnesota, and Fargo, North Dakota, July 19-22, 1921.—*B. B. Higgins.*

1843. COOK, MEL. T. Falling foliage. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 571-573. 1920 [1921].—This is a report of observations on spray mixtures, brown rot (*Sclerotinia cinerea*), peach scab (*Cladosporium carpophilum*), and cherry leaf spot (*Cylindrosporium padi*), as important factors in causing leaves to fall prematurely.—*Mel. T. Cook.*

1844. COOK, MEL. T. Falling foliage. *Phytopathology* 11: 337-339. 1921.—Field observations on premature leaf fall of fruit and shade trees, extending over several years, have led to the conclusion that there are many causal factors. Among the more important are low temperature while the leaves are at certain stages of development, sun scald and drought, debility of the tree brought on by unsuitable soil or insect injury, and spray injuries.—*B. B. Higgins.*

1845. COOK, MEL. T. Report of the department of plant pathology. *Ann. Rept. New Jersey Agric. Exp. Sta.* 41: 557-570. 1920 [1921].—This includes a statement of the investigations in progress and other work of the department, and a list of the most important plant diseases of the year.—*Mel. T. Cook.*

1846. COOK, MEL. T. Report of the department of plant pathology. *Ann. Rept. New Jersey Agric. Exp. Sta.* 40: 523-535. 1919 [1920].—This statement of researches in progress, epidemics, publications, and needs, includes a list of the most important diseases of the year.—*Mel. T. Cook.*

1847. COOK, MEL. T. Wilting caused by walnut trees. *Phytopathology* 11: 346. 1921.—In a number of cases, wilting of tomato and Irish potato plants has been noted in soil in which roots of *Juglans nigra* are growing.—*B. B. Higgins.*

1848. COOLEY, J. S. Disinfecting laboratory cutting instruments. *Phytopathology* 11: 373. 1921.—Plunging into alcohol, 70-90 per cent, and then burning off the alcohol, is recommended.—*B. B. Higgins.*

1849. CUNNINGHAM, G. H. Some recent changes in the names of plant diseases. *New Zealand Jour. Agric.* 23: 163-166. 1921.—The object of this series of articles is to explain the present status of nomenclature and to standardize the common names of plant diseases occurring in New Zealand. The diseases are listed according to host groups, and all synonyms of the scientific names occurring in New Zealand literature are given, with reasons for retaining the present names. A brief statement as to habit or character of the disease is also given.—*N. J. Giddings.*

1850. DICKSON, B. T. Report of the delegate to the Canadian Branch of the American Phytopathological Society. *Ann. Rept. Quebec Soc. Protection of Plants* 13: 20-23. 1921.—The 2nd annual meeting was held Dec. 9 and 10, 1920, at the Ontario Agricultural College, Guelph. An account of each paper is given.—*B. T. Dickson.*

1851. DUFRENOY, JEAN. Anaerobic bacteria in plant tissues. *Phytopathology* 11: 344. 1921.—Sections of certain diseased plant tissues gave bacterial growth only when embedded in the culture medium.—*B. B. Higgins.*

1852. EYER, J. R. Preliminary note on the etiology of potato tip-burn. *Science* 55: 180-181. 1922.—Tip-burn of the potato plant is caused by infection with a "specific" transmitted by the leaf hopper (*Empoasca Malii*). Sunlight is an important but not an essential factor in the progress of the tip-burn after its inception.—*C. J. Lyon.*

1853. FENTON, F. A., and I. L. RESSLER. Artificial production of tip-burn. *Science* 55: 54. 1922.—Experiments in injecting emulsions made by crushing the bodies of the adults in water have proved that the potato leaf hopper, *Empoasca Malii*, is the causal factor in the production of tip-burn or hopper-burn of potato. Emulsions from crushed nymphs did not produce pronounced burning.—*C. J. Lyon.*

1854. FULMEK, LEOPOLD, und A. STIFT. Über im Jahre 1919 erschienene bemerkswerte Mitteilungen auf dem Gebiete der tierischen und pflanzlichen Feinde der Kartoffelpflanze. [A review of the most important contributions in 1919 to the field of plant and animal parasites of the potato plant.] *Centralbl. Bakt.* II Abt. 53: 321-342. 1921.

1855. HOFFMAN, I. C., and M. T. COOK. Report of corn root and stalk rot investigations, 1919. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 598-604. 1920 [1921].—This paper gives the results of experiments with healthy and diseased corn. Greater yield was obtained from healthy than from diseased corn, and from starchy than from horny varieties.—*Mel. T. Cook.*

1856. KERN, FRANK D. Distribution of *Berberis vulgaris* in Pennsylvania. Bull. Torrey Bot. Club 48: 263-269. 1921.—The plant has become established in many counties and under varied conditions. Residual and glacial soils seem to be equally favorable. Thickets are to be found along streams, roadsides, in pastures, and on half-wooded hillsides.—*P. A. Munz.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 934, 980, 1186, 1234, 1596, 1824, 1892, 1915, 2048)

1857. ANONYMOUS. *Momordica cochinchinensis*. Kew Bull. 1920: 6-12. 1920.—Seeds of this plant are occasionally sold as *Strychnos nux-vomica* but are found to contain no alkaloid. They contain a drying oil which may be useful in the manufacture of paints and varnishes.—*E. Mead Wilcox.*

1858. ANONYMOUS. [Rev. of: TSCHIRCH, A. Handbuch der Pharmakognosie. (Handbook of pharmacognosy.) Vol. 3, parts 1-4 and 9-37. Chr. Herm. Tauchnitz: Leipzig, 1908-14.] Nature 108: 203-204. 1921.—“Treatment of each individual drug in the 2nd part is very complete. The microscopic characteristics of powdered drugs are usually dismissed in a few lines.”—*O. A. Stevens.*

1859. ARNOLD, L. Note sur l’*Atractylis gummifera*. (Chardon à glu. Haddad-Ladad.) [Note on *Atractylis gummifera*. Glue-thistle. Haddad-Ladad.] Bull. Sci. Pharm. 28: 372-373. 1921.—It is generally accepted that the root of this plant is poisonous, but the author points out that the root is chewed by Arabian shepherds. It is also used for perfume and for making glue, but never as food.—*H. Engelhardt.*

1860. BAILEY, E. M. The twenty-fifth report on food products and the thirteenth report on drug products, 1920. Connecticut [New Haven] Agric. Exp. Sta. Bull. 107. 827-833. 1921.—Analyses of foods and drugs on sale in the state are given. The foods include cereal products, cider, cocoa, coffee, dessicated foods, diabetic foods, fats and oils, gelatin, syrups, tea, vinegar, miscellaneous foods, and poisons. The drug analyses include proprietary remedies, soap, toilet preparations, tincture of cinchona, tincture of cinchona compound, hydrogen dioxide, lime water, solution of magnesium citrate, tincture of nux vomica, saturated solution of potassium iodide, witch hazel water, miscellaneous drugs, and gasoline. In all, 2,224 food products and 235 drugs were analyzed. Of these 339 food products and 47 drugs were adulterated, below standard, or otherwise illegally constituted.—*Henry Dorsey.*

1861. CHEVALIER, AUG. Le Chénopode à essence vermifuge ou Thé de Mexique. *Chenopodium Ambrosioides* L. [Chenopodium containing a vermifuge essential oil, or Mexican tea.] Bull. Sci. Pharm. 28: 129-145. 1921.—The uses, cultivation, and microscopical characters are discussed. The nearly related species are described, and the geographic distribution of the plant, its properties, etc., are considered. Cultivating the plant in the French colonies is recommended.—*H. Engelhardt.*

1862. GIBB, T. Juice of the poppy. The cultivation, manufacture and taxation of opium in India. Sci. Amer. 125: 238-239. 5 fig. 1921.

1863. GORIS, A., et P. COSTY. Sur la nature des alcaloïdes contenus dans l'extrait de belladonne. [The nature of the belladonna alkaloids.] Bull. Sci. Pharm. 28: 545-549. 1921.—Belladonna leaves contain chiefly hyoscyamine and a small amount of atropine. Since the former is twice as active physiologically as the latter, experiments were undertaken to estimate the optically active hyoscyamine polarimetrically. A method for determining this is given both for the leaves and the extract. It was found that when heat is used in the preparation of the extract a rather large percentage of the hyoscyamine is converted into the racemic atropine.—H. Engelhardt.

1864. GORIS, A., et A. LARSONNEAU. Recherches sur la composition chimique des feuilles de belladonne. [Investigation of the chemical composition of belladonna leaves.] Bull. Sci. Pharm. 28: 499-503. 1921.—The authors found that belladonna leaves contain a number of volatile bases, to which the effect of the leaves has often been attributed. They isolated an amine of the aliphatic series, pyradine, n. methyl pyrrolidine, and n. methyl-pyrrolidine. The presence of these bases is important in the assay of the leaves, because they are likely to be estimated also in the determination of the alkaloids, and, having a considerably lower molecular weight, render the yield in alkaloids too high.—H. Engelhardt.

1865. KNIGHT, A. Poisonous plants. Agric. Jour. [British Columbia], 6: 96-97. 1921.—This is a brief popular article on some common plants of British Columbia poisonous to stock.—J. W. Eastham.

1866. LECLERC, H. Action cholagogue du rhizome du Polypodium vulgare. [Cholagogue action of the rhizome of *Polypodium vulgare*.] Bull. Sci. Pharm. 28: 258-260. 1921.—Clinical experiments have shown that the rhizome of *Polypodium* possesses cholagogue properties. An infusion of 20 parts of *Polypodium*, 10 of licorice, 5 of angelica root, and 200 of water is recommended for treating diseases of the liver.—H. Engelhardt.

1867. LECLERC, H. Étude clinique sur l'action antispasmodique de la ballote fétide. [Clinical study of the antispasmodic action of *Ballota foetida*.] Bull. Sci. Pharm. 28: 534-538. 1921.—Black horehound in conjunction with passion flower has been used by the author in treating spasms. Several clinical cases are described in detail.—H. Engelhardt.

1868. LUCIANI, P. Culture de la marjolaine dans la région Sfaxienne. Origanum marjorana; en arabe "Mord gouch." [Cultivation of marjoram in the vicinity of Sfax. *Origanum marjorana*; in Arabian "Mord gouch."] Bull. Sci. Pharm. 28: 249, 251. 1921.—Increased cultivation of marjoram in south Tunis is recommended.—H. Engelhardt.

1869. MARSH, C. DWIGHT, and A. B. CLAWSON. The Mexican whorled milkweed (*Asclepias mexicana*) as a poisonous plant. U. S. Dept. Agric. Bull. 969. 16 p., 2 pl. 1921.—*Asclepias mexicana*, described here, found in California, Nevada, and other states of the Pacific slope, U. S. A., is poisonous to stock, particularly sheep. Its effects are similar to those of other whorled milkweeds. Its toxicity is about equal to that of *A. pumila* and about $\frac{1}{2}$ that of *A. galloides*. The lethal dose is 6 times that of *A. galloides*, but only about $\frac{1}{2}$ that of *A. pumila*.—J. T. Buchholz.

1870. MARSH, C. DWIGHT, A. B. CLAWSON, JAS. F. COUCH, and HADLEIGH MARSH. Western sneezeweed (*Helenium hoopesii*) as a poisonous plant. U. S. Dept. Agric. Bull. 947. 48 p., 2 pl., 6 fig. 1921.—*Helenium hoopesii*, described here, is very abundant in overgrazed elevated stock ranges of Utah and the western U. S. A., causing "spewing" sickness of sheep and poisoning of cattle. Symptoms, pathology, and toxic dosage were worked out in detail. The poisonous principle, dugaldin, an easily decomposed glucoside, is a white amorphous solid soluble in alcohol, less soluble in water and chloroform, and forming with tannic acid a sparingly soluble compound only slightly poisonous. No effective medicinal remedy in treating poisoned animals has been found. The plant can not be successfully exterminated.

Restoration of the range by growth of other plants is exceedingly slow. Proper handling of herds to prevent most of the losses is the most important remedial measure.—*J. T. Buchholz.*

1871. MAURIN, E. *Le dosage des composés oxyméthylanthraquinoniques dans les drogues qui les renferment.* [Estimation of the oximethylanthraquinone compounds in drugs.] *Bull. Sci. Pharm.* 28: 373-376. 1921.—The author describes a method for estimating the above compounds, based in part on Tschirch's well-known method and Dael's gravimetric process.—*H. Engelhardt.*

1872. PAMMEL, L. H. *Acorns poisonous.* *Vet. Med.* 17¹: 36. 1922.—It is stated that there is no question but that the black and red acorns and some white acorns are injurious to live stock.—*C. D. Marsh.*

1873. PAMMEL, L. H. *Carpet weed suspected of being poisonous.* *Vet. Med.* 17¹: 36. 1922.—It has been claimed that *Drymaria holostoides* is poisonous to cattle in New Mexico. The author states that it has never been reported as poisonous, although closely related plants are known to be injurious.—*C. D. Marsh.*

1874. PAMMEL, L. H. *Castor oil plant poisonous.* *Vet. Med.* 16¹²: 49. 1921.—This is a general statement in regard to the poisonous properties of *Ricinus communis*.—*C. D. Marsh.*

1875. PAMMEL, L. H. *Dogwoods.* *Vet. Med.* 17¹: 36. 1922.—Plants suspected of killing cattle are identified as *Viburnum* and 3 species of *Cornus*. None of these is considered the probable cause of the deaths of the cattle.—*C. D. Marsh.*

1876. PAMMEL, L. H. *Elderberry.* *Vet. Med.* 17¹: 35-36. 1922.—Discussing the case of a cow in whose stomach seeds of *Sambucus canadensis* were found, the author states that there is little evidence of the poisonous character of this plant.—*C. D. Marsh.*

1877. PAMMEL, L. H. *Grease wood poisoning.* *Vet. Med.* 16¹²: 50. 1921.—It is stated that *Sarcobatus vermiculatus* is poisonous only in a mechanical way.—*C. D. Marsh.*

1878. PAMMEL, L. H. *Golden glow poisons.* *Vet. Med.* 16¹²: 50. 1921.—It is stated that *Rudbeckia laciniata* is undoubtedly poisonous.—*C. D. Marsh.*

1879. PAMMEL, L. H. *Pepper grass and flowering spurge.* *Vet. Med.* 16¹²: 50. 1921.—Pepper grass, *Lepidium apetalum*, is an irritant, and flowering spurge, *Euphorbia corollata*, causes dermatitis.—*C. D. Marsh.*

1880. PAMMEL, L. H. *Western poison cowbane.* *Vet. Med.* 16¹²: 33. 1921.—The poisoning of 3 boys in northern New Mexico by *Cicuta Occidentalis* resulted in 1 death. Some facts are given in regard to the plant and its effects.—*C. D. Marsh.*

1881. PAMMEL, L. H. *White snake root.* *Vet. Med.* 16¹²: 49-50. 1921.—The sickness and death of several cows is described, due apparently to *Eupatorium urticaefolium*. The author believes that the fatalities were not caused by this plant.—*C. D. Marsh.*

1882. PAMMEL, L. H. *Whorled milkweed.* *Vet. Med.* 16¹²: 34. 1921.—Data regarding whorled milkweeds are quoted from the publications of the U. S. Department of Agriculture, with an expression of the personal belief of the writer that the Iowa species is somewhat injurious.—*C. D. Marsh.*

1883. PERROT, EM. *Sur la noix ou châtaigne du Para.* [The Para nut or chestnut.] *Bull. Sci. Pharm.* 28: 353, 360. *Pl. 1, fig. 11.* 1921.—The 2 lecythidaceous trees, *Bertholletia excelsa* and *B. nobilis*, and especially their fruits, are described. The nut, used in making

confections and pastry, contains about 75 per cent of an oil congealing at 0°C. and from which stearin separates on standing. Its specific gravity is 0.918, saponification value 193, iodine number about 100. Rancid oils, which may contain as much as 16 per cent of fatty acids, are used for making soap.—*H. Engelhardt.*

1884. SHERSTONE, HAROLD J. An account of the collection of camphor in the island of Formosa. *Practical Druggist* 40: 42. 1922.

1885. SPRAGUE, T. A. Plant dermatitis. *Jour. Bot.* 59: 308-310. 1921.—This is a short discussion of some of the Anacardiaceae not included in E. Philip Smith's list (*Jour. Bot.* 58: 175. 1920) of plants which cause dermatitis.—*Adele Lewis Grant.*

1886. STOCKBRIDGE, F. P. The summer sneezer. *Sci. Amer.* 125: 45, 55. 1921.—Certain individuals are hypersensitive to certain proteins, such as of cat hair, dog hair, cattle hair, chicken feathers, and similar animal integuments, as well as to pollens of all sorts, and foodstuffs generally. The symptoms are usually bronchial and often asthmatic, usually accompanied by a rise in temperature and often by blotches or other skin eruptions. The treatment consists in administering minute but gradually increasing doses of the offending protein by the mouth or subcutaneously until immunity is established.—*Chas. H. Otis.*

1887. TROY, O. E. Field observations in loco poisoning. *Jour. Amer. Vet. Med. Assoc.* 60: 299-305. 1921.—The symptoms produced by *Oxytropis Lamberti* in northern New Mexico are described. Bulletin 129 of the U. S. Bureau of Plant Industry is criticised, but without reference to succeeding bulletins of the U. S. Department of Agriculture in which it was shown that the conclusions of Bulletin 129 were wrong. Methods of eradicating loco weed are discussed briefly.—*C. D. Marsh.*

1888. VINALL, H. N. A study of the literature concerning poisoning of cattle by prussic acid in sorghum, Sudan grass and Johnson grass. *Jour. Amer. Soc. Agron.* 13: 267-280. 1921.—This is a review of the literature, and remedies for hydrocyanic acid poisoning.—*F. M. Schertz.*

1889. WEITZ, R. Le lyciet (*Lycium vulgare* Dunal); recherches botaniques, chimiques, et pharmacologiques. [Lyciet (*Lycium vulgare* Dunal); botanical, chemical, and pharmacological investigations.] *Bull. Sci. Pharm.* 28: 503-508, 562-563. *Fig. 1.* 1921.—Young sprouts of the plant are used as salad. While the fruits of *Lycium vulgare* and of other species of *Lycium* are edible, those of *L. barbarum* have frequently caused the death of camels. The toxicity appears to be due to betaine and choline in the fruits. A botanical description of *L. vulgare* and allied species is given.—*H. Engelhardt.*

1890. YOUNGKEN, HEBER W. Muira-Puama. *Proc. Pennsylvania Pharm. Assoc.* 44: 169-171. *2 fig.* 1921.—*Liriosma ovala* Miers is a small oleaceous tree the roots of which yield the drug Muira-Puama. The author describes the plant, the histology of the roots, and the powdered drug.—*M. S. Dunn.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 900, 903, 912, 915, 920, 1356, 1357, 1387, 1476, 1587, 1602, 1607, 1655, 1688, 1727, 1729, 1763, 1863, 2049)

GENERAL

1891. ANONYMOUS. Plant biochemistry. [Rev. of: THATCHER, R. W. The chemistry of plant life. *xvi + 268 p.* McGraw-Hill Book Co.: New York and London, 1921 (see Bot. Absts. 8, Entry 1449).] *Nature* 108: 364-365. 1921.—The book is considered a good elementary

presentation. Too little space is given to nitrogen compounds, and the chapter on carbohydrates will be found difficult unless stereo-chemistry is well understood.—*O. A. Stevens.*

1892. FORSTER, M. O. The laboratory of the living organism. *Nature* 108: 243-247. 1921.—[Abridged from presidential address to section B (chemistry) of the British Association at Edinburgh.] The author discusses vegetable alkaloids, nucleic acids, chlorophyll, anthocyanins, and micro-biochemistry.—*O. A. Stevens.*

1893. TURRILL, W. B. Practical plant biochemistry. [Rev. of: ONSLOW, M. W. Practical plant biochemistry. vii + 178 p. University Press: Cambridge, 1920 (see Bot. Abst. 8, Entry 602; also 8, Entries 599, 2153; 10, Entries 252, 1332).] *Kew Bull.* 1920: 288. 1920.

PROTOPLASM, MOTILITY

1894. MACBRIDE, THOMAS H. Some of the ways of the slime-mould. *Mycologia* 13: 329-334. 1921.—This is a physical explanation for the movement of a plasmodium in which surface tension and mass tension are believed to be involved.—*H. R. Rosen.*

DIFFUSION, PHYSICO-CHEMICAL RELATIONS

1895. BRADFORD, S. C. On the theory of gels. *Biochem. Jour.* 15: 553-562. Pl. 8. 1921.—It is demonstrated by the experiments described that gelatin has a definite solubility at 18°C. of 0.12 gm. per 100 cc. of solution. As the concentration is slightly increased, the gelatin is deposited as a gelatinous precipitate, made up of particles just below microscopic size, together with a few spherites reaching 1μ. Further concentration results in a decrease in the size of particles and an increase in the gelatinous precipitate. At 0.7 per cent concentration, the precipitate fills the solution and forms a white cloudy jelly. The author holds that these results confirm the view that such gels as gelatin, agar, starch, and silicic acid jelly possess a granular structure.—*A. R. Davis.*

1896. HATNES, D. The action of salts and non-electrolytes upon buffer solutions and amphoteric electrolytes and the relation of these effects to the permeability of the cell. *Biochem. Jour.* 15: 440-461. Fig. 1-8. 1921.—The author confirms a certain aspect of Henderson's work [Amer. Jour. Physiol. 21: 173, 427. 1908] on the effect of neutral salts and non-electrolytes on certain buffer mixtures, the addition of neutral salts increasing and non-electrolytes decreasing H-ion concentration. On the basis of her observations the following theory of permeability is suggested: "The semi-permeable membrane is assumed to be a gel, the more solid phase of which consists principally of emulsoid colloids having an amphoteric character, the liquid phase of a buffer mixture. Such a membrane will have a maximum permeability at the iso-electric point, since at this point the continuous phase will not only be in a state of minimum hydration and will thus occupy a minimum volume, but will also be without charge. Above the iso-electric point, the membrane will carry a positive charge and will repel cations; below the point it will carry a negative charge and repel anions. The membrane then will be peculiarly impermeable to charged ions, except in the immediate neighborhood of the iso-electric point. Additions of salts and non-electrolytes will modify the permeability of the plasma membrane by the changes which they produce in the reaction of the buffer mixture of the protoplasm." The author also discusses the bearing of the work on antagonism, as well as upon stimulation and narcosis.—*A. R. Davis.*

1897. LOONEY, J. M. The preparation of flexible collodion membranes. *Jour. Biol. Chem.* 50: 1-4. 1922.—Remarkable flexibility in collodion membranes was secured by adding ethyl acetate to solutions of collodion in mixtures of alcohol and dry ether.—*G. B. Rigg.*

1898. RABER, ORAN L. The effect upon permeability of (I) the same substance as cation and anion, and (II) changing the valency of the same ion. *Amer. Jour. Bot.* 8: 464-470. 1921.—Previous work has seemed to show that cations cause a decrease in the permeability of *Laminaria* tissues and anions an increase. This was here emphasized by studying the

effect of chromium, which may occur both as a cation and as an anion. In the former state the first effect is to decrease permeability, in the latter to increase it.—Ferric chloride causes a greater increase in resistance than ferrous chloride, independent of the H-ion concentration. The difference seems to depend upon the valency.—*E. W. Sinnott.*

1899. STILES, W. The penetration of electrolytes into gels. IV. The diffusion of sulphates in gels. *Biochem. Jour.* 15: 629-635. 1921.—Diffusion rates of a number of sulphates into agar and gelatin gels were studied by the indicator method outlined by the author in previous papers. Diffusion coefficients for NH₄, K, Na, and Mg sulphates with 0.5 per cent agar were slightly less than those in pure water, while with 10 per cent gelatin the values for these salts were about 25 per cent lower. CuSO₄, on the other hand, gave with agar a diffusion coefficient considerably greater than in water. However, in gelatin the coefficient was smaller than in water but higher than for the other sulphates. The author concludes that the relatively slight absorption of sulphates by plant tissue is not to be explained on the basis of retarded diffusion through a gel.—*A. R. Davis.*

1900. STILES, W., and G. S. ANAIR. The penetration of electrolytes into gels. III. The influence of the concentration of the gel on the coefficient of diffusion of sodium chloride. *Biochem. Jour.* 15: 620-628. 1921.—The coefficient of diffusion of NaCl into agar and gelatin gels was studied in relation to gel concentration. The general results show that this diffusion value decreases rapidly at first with increasing gel concentrations and shows an exponential relation. Above 2 per cent, however, the rate of decrease falls off, the curve connecting the coefficient of diffusion with gel concentration becoming approximately a straight line.—*A. R. Davis.*

1901. TRÖNDLE, ARTHUR. Über den Einfluss von Verwundungen auf die Permeabilität nebst ergänzenden Beobachtungen über die Wirkung des Sauerstoffzugs. [The influence of wounding on permeability, and observations on the effect of withdrawal of oxygen.] *Beih. Bot. Centralbl.* II Abt. 38: 353-388. 1921.—The investigations of the last century have shown that the permeability of the cell is modified by outside conditions or factors, as light, temperature, and salts; also that wounding increases temperature, causes more rapid respiration, movement of the nucleus, changes in the chromatophore, streaming of protoplasm, and variation in growth.—In the experiments here reported seedling roots of *Lupinus albus*, *Vicia faba*, *Allium cepa*, and *Pisum sativum* were used. The results of many experiments are tabulated. These show that wounding decreases absorption. This could be due to a stiffening or hardening of the protoplasm or to a change in permeability. Plasmolytic experiments showed it to be the latter.—The reduction of permeability produced by wounds may have a biological significance in that it might hinder the escape of material from wounded areas.—*L. Pace.*

1902. WISSELINGH, C. VAN. Untersuchungen über Osmose. [Researches on osmosis.] *Flora* 113: 359-420. 14 fig. 1920.—The epidermal cells of the seed of *Cuphea lanceolata* were found to be favorable material for use in studying the osmotic properties of certain solutions and the permeability of the cells towards these solutions. The Lythraceae are characterized by the presence in the epidermal cells of inverted hairs which are everted when the seed are placed in water. The writer disagrees with earlier workers who considered the eversion to be a mere swelling of the cellular contents, in which a protoplasmic membrane plays no part. The dimensions of the epidermal cells approximate 44 × 25 × 48 μ . The internal hair is suspended from the outer cell wall in several coils, making it several times the length of the cell. The hair appears as a screw with the threads close together. Microchemical methods were used to show the 5 layers of the cell wall, the 2 substances in the wall of the hair, and the presence of sugar and proteins in the cell cavity. A 50 per cent solution of KOH was the only solution causing the plasma membrane to separate from the cell wall. The eversion of the hair is accompanied by the rupture of the cuticle over the hair, the inner layers remaining intact. The eversion occurs with considerable rapidity. The inner contents (Füllmasse) of the hair is forced out with elongation. It first appears as a screw and then dissolves in the water.

The resistance of the cells to heat is great, when dry withstanding 150°C. for 1 hour; also 105°C. for 1 hour in a 25 per cent sugar solution and 110°C. for $\frac{1}{2}$ hour. No eversion occurs after 120°C. for 1 hour in a 25 per cent sugar solution; it does occur in alcohol up to 30 per cent; and not after soaking in 70 per cent alcohol for several days and then returning the seed to water. Treatment with absolute alcohol or with tannin has no effect. Electrolytes in concentrations of 0.2 M-0.8 M stop elongation. The process is stopped for only a few minutes by a 2 M solution of urea, but for 15 minutes by 1 gm. urea in 1 gm. water. Elongation was much more rapid at 35°C. than at 19°C., and the osmotic pressure decreases with elongation. Placed in a 1 M solution of glycerin for 1 day and then returned to water, the rate of elongation is increased and the osmotic pressure when eversion is complete is so great that it will rupture the end of the hair, which collapses and contracts.—The osmotic pressure developed in the eversion of these hairs was used to compare the molecular weights of cane sugar and glycerin and the dissociation of NaCl, KNO₃, and K₂SO₄. This was accomplished by finding the concentration which would stop eversion or cause a slight contraction. The concentrations of each solute were varied by $\frac{1}{4}$ M. The solutions to be compared were always tested on the same hair, the length of which was kept constant by transferring it to slightly hypo- or hypertonic solutions. Comparing this biological method with electrical conductivity, the depression of the freezing point, and the raising of the boiling point, the results are as dependable as those secured by physical methods. The permeability of the plasma membrane was determined. Ethylalcohol, urea, and antipyrin entered the cell readily and in the order named. NaCl, KNO₃, cane sugar, acetic acid, oxalic acid, and CuSO₄ enter the cell very slowly. The results with urea and glycerin are not entirely in agreement with those of Overton, and suggest a difference in permeability probably due to the diverse protoplasms of these biological indicators used.—C. H. Arndt.

WATER RELATIONS

1903. LOFTFIELD, J. V. G. The behavior of stomata. Carnegie Inst. Washington Publ. 314. 104 p., 64 fig., 18 pl. 1921.—The introduction deals mainly with Lloyd's method of measuring stomatal apertures by means of bits of epidermis stripped from the leaf and immediately dehydrated in alcohol. The author regards this method as very good, and employs it largely in his experimentation. Stomata were also measured *in situ*, as was also done by Lloyd.—The body of the book consists of 3 sections: (1) the daily march of stomatal movement; (2) effect of physical factors and plant conditions upon stomatal movement; (3) effect of stomatal movement upon transpiration. These are followed by a 2-page bibliography.—(1). Changes in stomatal aperture were calculated in terms of the percentage of alteration from the maximum aperture value for the day in question, the resulting percentage values being considered as proportional to the corresponding stomatal diffusive capacities. The diurnal march of these values is reported especially for alfalfa, potato, sugar-beet, onion, and several cereals, and many other plants were studied also. Three types of stomatal behavior were encountered, represented by barley, alfalfa, and potato. In the 1st type (barley) the stomata show no opening at night, no matter how slight the day opening. In the 2nd (alfalfa) the stomata are generally open by day and closed by night, but "as the conditions become less favorable" (mainly decreased moisture supply and increased aridity of the aerial surroundings) the stomata show increasing night opening and prolonged mid-day closure. In the 3rd (potato) the stomata are generally open both by day and by night, closing "only as the water-content [of the soil] decreases or evaporation becomes greater." "The daily march of stomatal movement varies more or less from day to day," being related to environmental conditions. In most plants the stomatal changes are correlated with differences in light intensity (as measured by a photographic-paper actinometer); in a few plants light appears to be without influence. In the marsh plants studied the stomata did not change at all, remaining open in *Equisetum* even during wilting and after death. The stomata of the upper and lower surfaces of the same leaf generally behave differently, at least when there are structural differences between the 2 sides, and stem stomata behave differently from leaf stomata.—(2). The environmental conditions considered were: light, temperature (including air and soil temperature

and also the heating influence of sunlight), evaporation, the air conditions that influence the evaporating power of the air (temperature, humidity, and wind), and water content of soil. Internal conditions also influence stomatal movement, especially leaf moisture-content. All these conditions were studied with reference to their influence upon the transpiration rate as well as to their influence upon stomatal movement. Atmometers are said to be of little use, but an absorbent-paper form gave better correlations with the transpiration rate than did an open pan of water or a white porous-clay cylinder. "Relative transpiration" is considered as of no value at all for the separation of the influences of external and internal conditions, so long as the exposure of the atmometer used is not precisely that of the plant dealt with. This point is strongly emphasized.—Moonlight corresponding to $\frac{1}{2}$ of mid-day sunlight intensity may cause night-closed stomata to open, especially after midnight. A rise in soil temperature may result in the closing of day-open stomata. High atmospheric humidity tends to make "the stomata open wider and remain open longer." The transpiration rate was generally increased by wind less than the evaporation rate from an atmometer; but sudden high wind often showed more effect on transpiration. Water-logging of the soil caused stomatal closure and even wilting. The nightly maximums of leaf turgor increase after each rain and then decrease until the next rain. When the leaf moisture content is below a critical value the stomata tend to close in spite of a light influence tending to open them.—(3). The stomatal movement of cut shoots in potometers is generally very different from that exhibited by potted plants or field plants, so that the potometer method of studying the influence of stomata on transpiration is to be discarded (that is, if the results are supposed to apply directly in the case of plants). Although the external conditions affecting evaporation exert great influence on the transpiration rate, "this influence is definitely controlled by the stomata." When the stomata are wide open the transpiration rate is said to be controlled only by the external conditions. As the stomata close the influence of the evaporating power of the air is decreased. When closure is nearly complete stomatal movements are markedly influential in determining the transpiration rate, overshadowing external changes. The author maintains that stomata generally control transpiration, despite what other writers have held, but says that when stomata are more than half open this stomatal control is masked by the influence of evaporation conditions.—The illustrations are graphs of stomatal movement, transpiration, etc., and most of the plates are micro-photographs of stomata.—*B. E. Livingston.*

MINERAL NUTRIENTS

1904. CLARK, A. W., and R. F. KEELER. A modified method for the determination of phosphoric acid. *Jour. Assoc. Official Agric. Chem.* 5: 103-104. 1921.—The modification consists in precipitating at room temperature, drying the precipitate for 2 hours at 120°C., and in the factor used for phosphoric acid.—*F. M. Schertz.*

1905. LATSHAW, W. L. Report on sulphur and phosphorus in the seeds of plants. *Jour. Assoc. Official Agric. Chem.* 5: 136-138. 1921.—It is believed that a large Parr bomb can be used successfully for determining sulphur and phosphorus in plant material.—*F. M. Schertz.*

1906. SMITH, A. M. Pot culture tests on the availability of potassium from greensand composts. *Jour. Assoc. Official Agric. Chem.* 5: 133-136. 1921.—In the growth of barley the potassium contained in greensand-sulphur-manure compost was practically equal in availability to an equivalent amount supplied in the form of potassium sulphate. Lime applied to soil treated with the composted material, or to the compost, does not decrease the availability of the potassium but is essential to secure increased yields. Greensand-sulphur-manure compost, when applied to a soil of low potassium content and deficient in organic matter, gave better yields at the end of the first growing season than an application of the same materials uncomposted.—*F. M. Schertz.*

1907. TRUE, RODNEY H. The significance of calcium for higher green plants. *Science* 55: 1-6. 1922.—Reference is made to the work of Ringer and Knudson, who showed that calcium is needed by animal and plant tissues to prevent disintegration. Further research

by the author and H. H. Bartlett showed that a function of the calcium ion is to make "physiologically available" the ions of other nutrient salts.—When the calcium is absent from the nutrient solution, various ions leach out of the roots of seedlings grown therein. Microchemical study showed that this was due to the substitution of potassium for calcium in the calcium pectate that constitute a middle lamella. This potassium pectate is soluble. The permeability of the cell walls is also increased. Magnesium most nearly replaces calcium without injury, but even magnesium is toxic to the cells.—*C. J. Lyon.*

PHOTOSYNTHESIS

1908. LUBIMENKO, V. De l'état de la chlorophylle dans les plastes. [The condition of chlorophyll in the plastids.] Compt. Rend. Acad. Sci. Paris 173: 365-367. 1921.—The photochemical inactivity of extracted chlorophyll is presumably due to a change in the chlorophyll during extraction. This is indicated by the noticeable difference in the absorption spectrum of the living leaf and that of chlorophyll *a* and *b*. An attempt was made to extract chlorophyll from the leaf without the loss of the photochemical activity of the substance. This was accomplished by extracting the chlorophyll with pure water after crushing the leaf in a mortar. In this case the absorption spectra of the living leaf and of the extracted chlorophyll are identical. However, the extract is not stable and coagulation begins at once. A search was made for a plant which yielded a more stable extract and such a plant was found in *Aegiphila elatior*. This was found to yield an extract which remained stable for some time in sunlight and for a month in diffuse light. It is concluded that there is only 1 green material in leaves, which is broken down by ordinary methods of extraction into chlorophyll *a* and *b* and the various yellow pigments.—*C. H. Farr.*

1909. WARBURG, OTTO. Theorie der Kohlensäure Assimilation. [A theory of carbon dioxide assimilation.] Naturwissenschaften 9: 354-358. Fig. 1-4. 1921.—The question as to how the substances taking part in the process of assimilation in the living cell gain the power of reaction is answered by Warburg with his theory that these substances are absorbed by heavy metal-containing surfaces of the solid cell substances and thus activated. Any destruction of the surface of these heavy metal-containing particles results in the destruction of the place of the reaction and therefore the ability to assimilate is lost until the surfaces are restored. The existence of this surface and heavy-metal catalysis is then discussed and the factors which influence these catalytic processes resulting in assimilation are pointed out in detail.—*Orton L. Clark.*

METABOLISM (GENERAL)

1910. ANONYMOUS. Cellulose esters. [Rev. of: WORDEN, E. C. Technology of cellulose esters. (In 10 vol.) Vol. I-V. 3709 p. E. and F. N. Spon: London, 1921.] Nature 108: 266-267. 1921.—This is reported an exhaustive treatise of encyclopedic nature, involving 350,000 references to technical-scientific literature. The reviewer finds it lacking in arrangement and the volumes excessively heavy.—*O. A. Sterens.*

1911. BALDWIN, I. L. Hydrogen ion concentration and titratable acidity in relation to bacteriological media. Proc. Indiana Acad. Sci. 1919: 171-173. 1921.—A number of tests on different media were made and the results "show that the method of making media +1% phenolphthalein can not be depended upon to bring it to neutrality and that in case of all careful work the reaction must be determined by measurement of the hydrogen ion concentration."—*F. C. Anderson.*

1912. CLAYSON, D. H. F., F. W. NORRIS, and S. B. SCHRYVER. The pectic substances of plants. II. A preliminary investigation of the chemistry of the cell-walls of plants. Biochem. Jour. 15: 643-653. 1921.—In this paper the authors are concerned with a study of the cytopectans and cytopectic acid obtained from several different plants. Methods are described for preparation of these compounds and analyses are made of the various constituents.—*A. R. Davis.*

1913. COUPIN, HENRI. *Sur ce que les graines fournissent aux plantes adultes.* [The substances which seeds supply to the adult plant.] Compt. Rend. Acad. Sci. Paris 173: 579-600. 1921.—Seeds of dicotyledons were germinated in distilled water and marked differences in the development of the different seedlings were noted. Nourishment from seeds may contribute to the development of the root, hypocotyl, stem, leaves, and even to the flowers.—*W. K. Farr.*

1914. COWARD, K. H., and J. C. DRUMMOND. The formation of vitamin A in living plant tissues. Biochem. Jour. 15: 530-539. Fig. 1-3. 1921.—The formation of vitamin A by plants was found to be generally associated with chlorophyll. Etiolated seedlings and non-chlorophyllous plants such as the fleshy fungi, seem unable to synthesize this vitamin, while plants high in red color form it but slowly.—*A. R. Davis.*

1915. GOODSON, J. A. Constituents of the bark of *Zanthoxylum macrophyllum* Oliver. Biochem. Jour. 15: 123-128. 1921.—Petroleum and ether extracts of the bark of this plant yielded fagaramide, lupeol, and a resinous matter; such extracts also contained the irritant principle of the bark, but attempts to isolate it were not successful.—*Mildred L. Johnson.*

1916. HAAS, P. On carrageen (*Chondrus crispus*). II. On the occurrence of ethereal sulphates in the plant. Biochem. Jour. 15: 469-476. 1921.—The colloidal extract is separable into 2 fractions, depending upon different solubilities in hot and cold water. The hot-water extract was found to contain the calcium salt of an ethereal sulphate, the calcium being freely ionized, while the sulphate complex is not ionized until after hydrolysis.—*A. R. Davis.*

1917. HARDEN, A., and S. S. ZILVA. The synthesis of vitamine B by yeast. Biochem. Jour. 15: 438-439. 1921.—Yeast grown on a synthetic medium was found to contain less vitamin B than that grown on unhopped brewer's wort.—*A. R. Davis.*

1918. HOPKINS, F. G. On an autodisable constituent of the cell. Biochem. Jour. 15: 286-305. 1921.—This paper concerns the isolation of the substance responsible for the nitro-prusside reaction given by most animal tissues. The author was able to isolate it from yeast as well as from muscle and mammalian liver, and he found it to be a dipeptid containing glutamic acid and cystein. Although only making up 0.01-0.02 per cent of the fresh tissue, this compound contains practically all the non-protein, organically-bound sulphur of the cell. The substance can be both reduced and oxidized, owing to the changes in the sulphur group of the cystein fraction from the sulphydryl to the disulphide condition and vice versa. It is suggested that it has actual functions in the chemical dynamics of the cell.—*A. R. Davis.*

1919. KREMERS, R. E. The biogenesis of oil of peppermint. Jour. Biol. Chem. 50: 31-34. 1922.—Peppermint (*Mentha piperita*) is considered to be a cross between *M. aquatica* and *M. spicata* (spearmint). A possible chemical scheme of the biogenesis of the most important constituents of peppermint and spearmint has been drawn up, indicating a great similarity between the reactions by which the carvone group is formed in spearmint and the menthone group in peppermint. The 2 groups seem to have a common precursor, each being derived from it by a reaction involving the addition of 2 atoms of hydrogen, the difference being in the location of the point of reduction. The Mendelian "factor," if such it is, which governs the formation of the carvone group in spearmint and the menthone group in peppermint lies in the conditions affecting the reduction of citral, causing the reaction to occur at a different point in the 2 cases. This paper is preliminary and the work is being continued.—*G. B. Rigg.*

1920. LING, A. R., and D. R. NANJI. A method of estimating phenylhydrazine volumetrically and its application to the estimation of pentosans and pentoses. Biochem. Jour. 15: 466-468. 1921.—The authors use an iodometric method to determine the excess of phenylhydrazine required to precipitate the hydrazone, and it is reported very satisfactory.—*Grace E. Howard.*

1921. MOUNT, H. A. What are vitamines? *Sci. Amer.* 125: 76, 87, 4 fig. 1921.—This is a brief account of vitamins, their occurrence in fruits, vegetables, and grains, and their effects. Yeast as a food is briefly discussed historically.—*Chas. H. Otis.*

1922. RIGG, G. B. The identity of certain yellow pigments in plants and animals. *Science* 55: 101-102. 1922.—The probable identity of carotinoids and lipochromes is pointed out, and the author regards this as an interesting field for study.—*C. J. Lyon.*

1923. STAMMERS, ARTHUR DIGHTON. Feeding experiments in connection with vitamins A and B: I. The value of steam-distilled palm kernel oil as a control fat. II. Wheat bran as a source of vitamins A and B. *Biochem. Jour.* 15: 489-493. 1921.—The value of steam-distilled palm kernel oil as a control fat is not so great as that of butter. Wheat bran is a good source of vitamin A. The data are given in 2 sets of curves.—*Grace E. Howard.*

1924. TERROINE, ÉMILE-F., et RENÉ WURMSEY. Influence de la température sur l'utilisation du glucose dans le développement de *L'Aspergillus niger*. [The influence of temperature on the utilization of glucose in the development of *Aspergillus niger*.] *Compt. Rend. Acad. Sci. Paris* 173: 482-483. 1921.—This fungus was grown on Czapek's medium containing 8 salts and 300 gm. of glucose per l. In 47 determinations at different temperatures, namely, 22, 29, 36, and 38°C., the ratio of dry weight increase to glucose consumed was between 41 and 49 per cent with an average of 43 per cent. It is therefore concluded that the ratio of utilization does not vary with the temperature.—*C. H. Farr.*

1925. TUTIN, F. The behavior of pectin toward alkalis and pectose. *Biochem. Jour.* 15: 494-497. 1921.

1926. WESTER, D. H. I. Cultuurproefjes met Soja-Boonen. II. Voorkomen van Urease in andere Plantendeelen dan Zaden. [I. Culture experiments with soy-beans. II. The presence of urease in parts of the plant other than the seed.] *Pharm. Weekblad* 58: 1113-1119. 1921.—Comparing beans cultivated in 1917 and 1918 with the originals there are given data showing variations in content of moisture, carbohydrates, proteins, fat, and ash. Urea numbers were also determined for the seed and for the different parts of the plant. The urea numbers of the seed and other parts of the laburnum tree were determined and the leaves of *Cannabis* were found to be particularly rich in urease. No suggestion is made concerning the function of this enzyme in the plant.—*H. Engelhardt.*

METABOLISM (NITROGEN RELATIONS)

1927. BOAS, F. Die Bildung löslicher Stärke im elektiven Stickstoff-Stoffwechsel. [The formation of soluble starch in elective nitrogen metabolism.] *Ber. Deutsch. Bot. Ges.* 37: 50-56. 1919.—At a certain concentration of hydrogen ions *Aspergillus niger* forms soluble starch in the culture solution from various carbon compounds. When ammonium chloride is used as the nitrogen source, in the presence of saccharose, dextrose, or maltose, and at a culture temperature of 32.5°C., soluble starch is formed in consequence of the liberation of the strongly dissociated hydrochloric acid. In the case of other ammonium salts, such as the phosphate or citrate, the H-ion concentration necessary for the formation of soluble starch is not attained in consequence of the lesser dissociation of the acids which are formed. The author has used the formation of soluble starch, as indicated by the iodine test, to determine which of the 2 nitrogen sources is principally utilized when ammonium chloride and some other nitrogen source are simultaneously available to the fungus. The nitrogen sources which were used in addition to ammonium chloride were ammonium phosphate, ammonium citrate, algin, asparagin, peptone, gelatin, yeast water, acetanilid, and urea. In every case the appearance of soluble starch in considerable quantities showed that the ammonium chloride had been "preferred," in spite of the fact that its use involved the formation of a toxic mineral acid, and even though another good nitrogen source was present which would not have yielded a poisonous product. The slight dissociation of all the nitrogen sources except am-

monium chloride, and the very low lipid solubility of ammonium chloride and amino acids, as compared with that of the amides, permit the conclusion that lipid solubility did not determine which nitrogen sources should be used. The greater dissociation of the ammonium chloride was the factor determining its readier entrance into the cell and its use by the organism in "preference" to the other sources of nitrogen.—*R. M. Holman.*

1928. BONAZZI, AUGUSTO. On nitrification. IV. The carbon and nitrogen relations of the nitrite ferment. *Jour. Bact.* 6: 479-499. *Fig. 1-3.* 1921.—In a series of experiments with cultures of *Nitrosococcus* inoculated into solutions, some of which were freed from free carbon dioxide, the author arrives at the following conclusions: Nitrification takes place normally at the expense of the carbon dioxide formed by the reactions in the culture medium, and the process is checked by the complete absence of carbon dioxide, as when this compound is removed by concentrated alkali. The process of nitrification is dependent upon, and secondary to, the process of carbon assimilation. For a short period of incubation, although free atmospheric carbon dioxide was in contact with the solutions, no appreciable nitrification took place in the presence of magnesium oxide; but on prolonged incubation some nitrification takes place, the magnesium oxide being a retarding factor.—The author also concludes that the nitrogen nutrition of the organism is closely related to its carbon nutrition, in fact, completely dependent upon the latter. The free carbon dioxide is not only necessary for growth but is also necessary for the performance of the normal oxidative functions peculiar to the cells. When the optimum carbon dioxide tension is existent, the cells, during their life cycle, perform 2 synchronous functions,—one of cellular respiration and one of carbon assimilation, the former serving to initiate the process of nitrosofermentation and the second for the subsequent carbon assimilation. The bacterial cell is unable to assimilate the abundant stores of nitrogen in a nutritive solution in the absence of free carbon dioxide even though a carbonate be present.—*Chester A. Darling.*

1929. CAJORT, F. A. Some nutritive properties of nuts. II. The pecan nut as a source of adequate protein. *Jour. Biol. Chem.* 49: 389-397. 1921.—The principal protein of the pecan nut is a globulin. This nut is a source of adequate protein for young rats, but the presence of tannins in the nut is a limiting factor in their growth.—*G. B. Rigg.*

1930. CHIBNALL, A. C., and S. B. SCHRYVER. Investigations on the nitrogenous metabolism of higher plants. I. The isolation of proteins from leaves. *Biochem. Jour.* 15: 60-75. 1921.—The leaves of cabbage, scarlet runner, and spinach were crushed and treated with water containing ether as a cytolytic agent. The resulting extract contained an opalescent colloidal solution of the leaf protein, this latter coming down as a flocculent precipitate upon standing. The protein so obtained was separated into amid, humin, basic, and mono-amino nitrogen. Tables of analyses are given.—*A. R. Davis.*

1931. COOPER, E. A. Denitrification as a means of sewage purification. *Biochem. Jour.* 15: 513-515. 1921.

1932. HANKE, M. T., and K. K. KOESSLER. Studies on proteinogenous amines. XII. The production of histamine and other imidazoles from histidine by the action of microorganisms. *Jour. Biol. Chem.* 50: 131-191. 1922.—Of 29 strains of *Bacillus coli* (in the narrower sense) studied, 6 were able to convert histidine into histamine on the synthetic medium used. A number of other organisms (including *B. typhosus*, *B. proteus vulgaris*, and *B. tuberculosis*) were tried but none of them were histidine producers.—*G. B. Rigg.*

1933. HANKE, M. T., and K. K. KOESSLER. Studies on proteinogenous amines. XIII. On the electronic interpretation of certain biochemical phenomena. *Jour. Biol. Chem.* 50: 193-233. 1922. XIV. A micro-chemical calorimetric method for estimating tyrosine, tyramine, and other phenols. *Ibid.* 50: 235-270. 1922. XV. A quantitative method for the separation and estimation of phenols. *Ibid.* 50: 271-288. 1922.

METABOLISM (ENZYMES, FERMENTATION)

1934. BURNETT, THEO. C. Some remarks on catalase. *Univ. California Puhl. Physiol.* 5: 167-170. 1921.

1935. EDIE, E. S. A note on the identity of gastric rennin and pepsin. *Biochem. Jour.* 35: 507-509. 1921.—As a result of certain experiments, the author reaches the conclusion that the coagulating and fibrin-digesting powers of pepsin are due to distinct enzymes.—*A. R. Davis.*

1936. EDIE, E. S. Further observations on the digestion of fibrin and caseinogen by trypsin. *Biochem. Jour.* 35: 498-506. 1921.—Experiments on the effect of acid upon the fibrin-digesting and coagulating power of trypsin indicate that this is made up of a number of distinct enzymes; or, if 1 enzyme is involved, the different effects are due to different groupings within the enzyme molecule.—*A. R. Davis.*

1937. HARDEN, A., and F. R. HENLEY. The effect of acetaldehyde and methylene blue on the fermentation of glucose and fructose by yeast-juice and zymin in the presence of phosphate and arsenate. *Biochem. Jour.* 35: 175-185. Fig. 1-5. 1921.—Acetaldehyde was found to decrease the time required for a fructose-phosphate mixture to reach its maximum rate of fermentation, where yeast juice or zymin was employed as the enzyme. The maximum rate itself was not increased. This same compound increases the fermentation rate of fructose more rapidly than that of glucose, and is about 50 times as effective as fructose in inducing fermentation in a mixture of glucose with excess of phosphate. Arsenate increases the accelerating effect of acetaldehyde where zymin is used with fructose or glucose in the presence of phosphorus, but not when yeast juice is the fermenting agent. The effect of methylene blue is similar to that of acetaldehyde.—*A. R. Davis.*

1938. HARTER, L. L., and J. L. WEIMER. A comparison of the pectinase produced by different species of *Rhizopus*. *Jour. Agric. Res.* 22: 371-377. 1921.—The following species of *Rhizopus* were tested upon similar media but each at its optimum temperature: *arrhizus*, *atrocupri*, *chinensis*, *delemairei*, *maydis*, *microsporus*, *nigricans*, *nodosus*, *Oryzae*, *reflexus*, and *Triticci*. All the species produce pectinase and exude some of it into the culture solution, but the amount varies with the species. *R. atrocupri* and *R. nigricans*, both parasitic on sweet potato, secrete a relatively small amount of pectinase, while *R. chinensis* and *R. microsporus*, non-parasitic forms, secrete a relatively large quantity. These 4 species all exhibit relatively large amounts of pectinase in the mycelia.—*D. Reddick.*

1939. JACOBY, MARTIN. Fermentstudien. [Enzyme studies.] *Naturwissenschaften* 9: 588-592. 1921.—This paper embodies a brief account of the results of a series of studies made by the author during the past 10 years and published in the *Biochem. Zeitschr.*—*Orton L. Clark.*

1940. JANKE, ALEXANDER. Forschungsergebnisse auf dem Gebiete der Essigbakteriologie und Fortschritte der Gärungsindustrie. [Investigations in the field of vinegar bacteriology and the progress of the fermentation industry.] *Centralbl. Bakt.* II Abt. 53: 81-194. 1921.

1941. NEUBERG, CARL. Gärung und Synthese. [Fermentation and synthesis.] *Naturwissenschaften* 9: 334-337. 1921.—Fermentation is usually associated with dissimilation, but Neuberg points out that with the breaking down of the molecule there may also be associated certain synthetic processes. He has discovered a ferment, carbolicase, associated with zymase and carboxylase in fermentation, which has the capacity of building up the carbon chain without oxidation or reduction. The chemistry of this synthetic reaction as initiated by the ferment carbolicase is discussed in detail.—*Orton L. Clark.*

1942. ONSLOW, M. W. Oxidizing enzymes. IV. The distribution of oxidizing enzymes among the higher plants. *Biochem. Jour.* 35: 107-112. 1921.—This paper treats of the general distribution of an oxygenase, catalysing the oxidation of catechol, among the higher

plants. Approximately 60 per cent of the seed-plant orders were examined, of which about 62 per cent were found to contain species having this enzyme. The enzyme was found to be of more frequent occurrence in monocotyledonous than in dicotyledonous plants.—*A. R. Davis.*

1943. ONSLOW, M. W. *Oxidizing enzymes. V. Further observations on the oxidizing enzymes of fruits.* Biochem. Jour. 15: 113-117. 1921.—The author examined certain representative plants for the various components of oxidases. Methods of extraction are described.—*A. R. Davis.*

1944. RAISTRICK, H., and A. B. CLARK. *Studies on the cycloclastic power of bacteria. II. A quantitative study of the aerobic decomposition of tryptophan and tyrosin by bacteria.* Biochem. Jour. 15: 76-82. 1921.—Culture solutions containing tryptophan were inoculated with pure cultures of *Bacillus pyocyanus*, *B. fluorescens*, and *B. prodigiosus*. All 3 forms produced ammonia from both the side chain and the indole nucleus of the tryptophan molecule. With *B. proteus vulgaris*, ammonia formation is limited to side chain N. In the presence of glycerol, much free NH₃ and small amounts of synthesized N were produced, the reverse being true where glycerol was absent. The authors relate this to the "protein sparing" effect of carbohydrates. They believe that instead of exerting such action, the presence of carbohydrates actually permits the organisms under discussion to utilize more protein.—*A. R. Davis.*

1945. RONA, P. *Die Anwendbarkeit der Fermente bei Untersuchungen über Giftwirkungen. [The use of enzymes in studies on the effect of poisons.]* Naturwissenschaften 9: 976-980. Fig. 1-8. 1921.—There is given a brief discussion of studies which are being published more fully in the Biochem. Zeitschr.—*Orton L. Clark.*

METABOLISM (RESPIRATION, AERATION)

1946. ANDREWS, F. M. *The effect of aeration on plants.* Proc. Indiana Acad. Sci. 1920: 147-148. 1921.—Seedlings of *Avena saliva*, *Brassica alba*, *Pisum sativum*, and of other plants were grown in Sachs' culture solution. Some plants were aerated while others of the same species were not. In all cases the aerated specimens not only grew better and faster, but also showed 3-5 times the dry weight of the un aerated ones.—*F. C. Anderson.*

1947. LYON, C. J. *Comparative studies on respiration XVIII. Respiration and antagonism in Elodea.* Amer. Jour. Bot. 8: 458-463. 2 fig. 1921.—Respiration in leafy stems of *Elodea* was studied by immersing the plant in a solution containing an indicator, the production of CO₂ being measured by change in color of the indicator. Plants in solutions of NaCl showed an increase in respiration followed by a decrease. Those in CaCl₂ showed only a decrease. Both salts depress respiration after a sufficient length of exposure. In a mixture containing 99.65 mols of NaCl to 0.35 of CaCl₂ the rate remains normal, while a mixture of 98.62 mols of NaCl to 1.38 of CaCl₂ causes a great increase in respiration. The antagonism curve of NaCl vs. CaCl₂ is unique in that it has 2 maxima.—*E. W. Sinnott.*

1948. WAKSMAN, S. A., and J. S. JOFFE. *The chemistry of the oxidation of sulfur by micro-organisms to sulfuric acid and transformation of insoluble phosphates into soluble forms.* Jour. Biol. Chem. 50: 35-45. 1922.—The curve of sulphur oxidation both in the soil and in solution by pure and impure cultures of *Thiobacillus thiooxidans* is a growth curve. The mechanism of this oxidation obeys the laws of inorganic catalysis. The transformation of insoluble rock phosphate to soluble form by the sulphuric acid formed by this oxidation is similar to the process taking place in inorganic reactions.—*G. B. Rigg.*

ORGANISM AS A WHOLE

1949. ANONYMOUS. [Rev. of: CHAPMAN, A. CHASTON. *Micro-organisms and some of their industrial uses.* Jour. Roy. Soc. Arts 69: 581-589, 597-605, 609-619. 1921.] Nature 108: 187-188. 1921.

1950. CLEMENTS, FREDERIC E. Aeration and air-content, the rôle of oxygen in root activity. Carnegie Inst. Washington Publ. 315. 183 p. 1921.—This work is an extensive analysis of the literature dealing with the respiration of roots and with anaerobiosis. "An attempt has been made to present a complete digest of the results in so far as they have to do with transpiration, growth or movement, or seem to throw light upon the mooted questions of bog toxins, acid soils or toxic exudates." The views expressed by more than 400 investigators in over 700 separate publications are summarized. The author states that "a cursory survey of a score of textbooks shows that the air content of the soil is not even mentioned by the majority, while it is given slight attention by a few, and accorded recognition of primary importance by three or four only." He adds, "recognition of air-content as a primary factor in many habitats and as a controlling one in wet soils and water is yet to come." The evidence on each of the various topics of the subject is presented in historical sequence and is then brought together in each case in a brief summary. These topics are presented in 3 groups as follows: I. Respiration and oxygen (100 pages). (1) Normal respiration of roots, (2) aerotropism, (3) air of soil and plants (special topics discussed are air-content of the soil, air-content of water, influence of algae and water plants on oxygen-content, and air-content of plants); (4) anaerobic respiration (60 pages, devoted to respiration, photosynthesis, transpiration, germination, growth, protoplasmic streaming and mitosis, irritability, fungi, and aeration as an ecological factor). II. Bog xerophytes and acid soils (31 pages). III. Toxic exudates and soil toxins (15 pages). A bibliography of 21 pages is included, listing 714 publications by 427 authors.—Lee M. Hutchins.

1951. ENSIGN, M. R. Area of vein-islets in leaves of certain plants as an age determinant. Amer. Jour. Bot. 8: 433-441. 1 pl. 1921.—The author suggests certain possible inaccuracies in the technique employed by Benedict in studying the area of the vein-islets in the leaf and its bearing on senescence, since the leaves used were not cleared and doubtless differed considerably in thickness and thus in number of visible veins. The author compared the number and area of vein-islets in cleared with those in uncleared leaves of *Vitis* sp. and found that from 17 to 62 per cent of the islets are invisible in the latter. Cleared leaves from young and old plants of *Fagus*, *Castanea*, *Vitis*, and 2 species of *Berberis* were compared, and no correlation was found between the age of the plant and the vein-islet area of its leaves.—E. W. Sinnott.

1952. GORINI, D. CONSTANTINO. Weitere Untersuchung über die Biologie der Milch-säurebakterien. [Further investigations on the biology of the lactic acid bacteria.] Centralbl. Bakt. II Abt. 53: 285-287. 1921.—This is a summary of the principal results of the author's investigations in recent years with lactic acid organisms under the following headings: The acid proteolytic properties, the resistance to heat, the milk flora of the udder, the property of young cultures of producingropy milk, spore-forming lactic acid bacteria, the utilization of the lactic acid bacteria in the cheese industry and in the preparation of ensilage.—Anthony Berg.

1953. GROSßÜSCH, J. Zur Physiologie von *Torula rubefaciens* G. [The physiology of *Torula rubefaciens*.] Centralbl. Bakt. II Abt. 50: 310-317. 1920.—The nutrient solution used is as follows: 0.5 gm. CaHPO_4 , 4.55 gm. K_2HPO_4 , 2.10 gm. MgSO_4 , 21 gm. Witte's pepton, 1 l. distilled water. The behavior of the organism with formic, acetic, tartaric, lactic, citric, malic, and succinic acids is studied. The power of these acids to check gas formation varies from 0.1 per cent with formic acid to 11.0 per cent with succinic. The killing power with reference to these acids may be arranged in a descending series, thus: formic, acetic, tartaric, lactic, citric, malic, and succinic. Acid consumption is greatest with succinic and least with tartaric. Using the same nutrient solution as above, 7 per cent ethyl alcohol (by volume) is found to check gas formation while 15 per cent causes the death of the organism. Alcohol consumption for 2 months in percentage of the original alcohol is 9.4 per cent; for 4 months, 18.6 per cent; for 6 months, 55.4 per cent.—When Elfving's nutrient solution is used H_2S is produced.—The life history of the organism was worked out.—The fermentation of fruit-

juice wine, inoculated under 8 different conditions, using *Torula rubefaciens* G., an apple yeast, and a wood yeast, shows a variation in alcohol content after 25 months from 4.75 per cent to 4.85 per cent; total acid, 0.640 to 0.545 per cent; volatile acid, 0.212 to 0.102 per cent; and ester number 5.4 to 4.0 per cent.—*Grace E. Howard.*

1954. KUFPERATH, H. Recherches physiologiques sur les algues vertes cultivées en culture pure. II. [Physiological investigations of green algae grown in pure culture. II.] Bull. Soc. Roy. Bot. Belgique 54: 78-102. 1921.—The author studies first the action of different osmotic agents, chiefly inorganic salts, on *Chlorella luteo-viridis* Chodat var. *lutescens* Chodat. To the nutrient solution employed [distilled water 1000 cc., KNO_3 2 gm., $MgSO_4$ 0.5 gm., $Ca_3(PO_4)_2$ 2 gm., $CaSO_4$ 1 gm., and a trace of $FeCl_3$] there were added such substances as KNO_3 4 per cent, $Ca_3(PO_4)_2$ 2 per cent, variable amounts of $NaCl$; also of $NaCl$ combined with $Ca_3(PO_4)_2$, and with KNO_3 in various percentages. The more the amount of $NaCl$ was diminished the greater the tolerance of the alga toward KNO_3 . There would seem to be a certain equilibrium between the action of the salts used. Among the organic substances employed (saccharose, lactose), he determined that saccharose is very well utilized, while lactose is very slightly utilized, the difference being due to chemical constitution. The author studied finally the action of these sugars upon *Hormidium lubricum* Chodat. The aspect of the organism is changed by the concentration of saccharose. In the lower concentrations the alga has the form *nitens*. Lactose is favorable for the development of *Hormidium*.—*Henri Micheels.*

1955. LOTKA, ALFRED J. Note on moving equilibria. Proc. Nation. Acad. Sci. [U. S. A.] 7: 168-172. 1921.—In the representation of a material system by "a system of differential equations

$\frac{dx_i}{dt} = F_i(X_1, X_2, \dots; A_1, A_2, \dots; P, Q)$, the X 's denote masses of components, and the A 's, P 's, and Q 's denote parameters; "the A 's are parameters introduced by any equations of constraint to which the X 's may be subject" [see also Bot. Absts. 7, entry 424]. In the previous discussion, A , P , and Q were taken as constant; if they change, but slowly as compared with the X 's, a "moving equilibrium" ultimately results. A study of the effect of such a change (slow or rapid) on equilibrium leads to a consideration of thermodynamic equilibrium, the principle of Le Chatelier, etc. Radioactive equilibrium is taken for illustration of a moving equilibrium; here "a parameter of the class A , namely the mass of one of the links in the chain," acts as a limiting factor. Such limiting factors are very important in the cycles involving living organisms (as in "the cycle $CO_2 \rightarrow$ plant \rightarrow animal $\rightarrow CO_2$ "). Man's influence tends to increase the mass and velocity of such cycles.—*Howard B. Frost.*

1956. ROSSEELS, E. L'influence des microorganismes sur la croissance des végétaux supérieurs. 6.—Les mycorhizes. [The influence of microorganisms on the growth of higher plants. No. 6. Mycorhiza.] Bull. Soc. Centrale Forest. Belgique 23: 263-269. 1920.—The author emphasizes the greater importance for forest trees of the ectotrophic mycorrhiza, although this importance has often been overestimated. Of the numerous fungi participating in the formation of mycorrhiza only a small number have been identified (*Tricholoma*, *Russula*, *Cortinarius*, *Boletus*, *Elaphomycetes*). The author also discusses various changes in the nitrogen-containing organic compounds taking place in the forest soil through the interaction of various microorganisms.—*W. C. Lowdermilk.*

1957. ROSSEELS, E. L'influence des microorganismes sur la croissance des végétaux supérieurs. [The influence of microorganisms on the growth of higher plants.] Bull. Soc. Centrale Forest. Belgique 23: 305-314. 1920.—In this part of his series of papers the author discusses cellulose decomposition in forest soil; also various other decomposition processes accomplished by microorganisms; and prescribes various conditions contributing to the improvement of the soil for tree growth.—*W. C. Lowdermilk.*

1953. SINNOTT, E. W. The relation between body size and organ size in plants. Amer. Nat. 55: 385-402. 1921.—In a series of bean plants the author found a small positive correlation between plant size and average size per plant of leaf, pod, or seed. For small plants alone the correlation was high but after a certain plant size was reached further increase in plant size is not accompanied by increase in organ size. The author advances the idea that organ size may not be correlated with body size but with size of the primary meristem points, and in support of this he cites high correlation in the maple [*Acer*] between size of leaf pairs and size of growing tips of stems.—*J. P. Kelly.*

1950. TRAUTWEIN, K. Beitrag zur Physiologie und Morphologie der Thionsäurebakterien (Omelianski). [The physiology and morphology of the thionic acid bacteria (Omelianski).] Centralbl. Bakt. II Abt. S3: 513-560. Fig. 1-7. 1921.—On synthetic media containing thiosulphate, a thionic acid organism was isolated which in its physiological characteristics differ widely from the known organisms of this type. Tbiosulphate is oxidized only under aerobic conditions and without the formation of free sulphur. The product may be a sulphate, a dithionate, or a tetrathionate. The same organism under apparently identical conditions may produce either one of these compounds. The organism is not carbon autotrophic. It can thrive better on organic carbon combinations and is therefore one of the few known facultative carbon autotrophic bacteria. The nitrogen requirements may be satisfied by either organic or inorganic nitrogen compounds. The optimum temperature, when ammonium chloride is used as a source of nitrogen, is 17°C. The effect of the H-ion concentration of the media was carefully studied. The organism is rod shaped ($1-2 \times 0.5 \mu$), motile, liquifies gelatin slowly, and does not produce pigment. The organism appears to be widely distributed in nature. It was isolated from both soil and water.—*Anthony Berg.*

GROWTH, DEVELOPMENT, REPRODUCTION

1960. BOAS, F. Bemerkungen über konidienbildende Stoffe bei Pilzen. [Substances which promote the formation of conidia in fungi.] Ber. Deutsch. Bot. Ges. 37: 57-62. 1919.—The formation of conidia in *Aspergillus niger* is very greatly dependent upon the composition of the culture solution. Among the most commonly used nutrient substances 4 groups can be distinguished on the basis of their influence upon the development of mycelium and conidia of *Aspergillus niger*, as follows: (1) those which give abundant growth of mycelium and quick and abundant development of conidia; (2) those which give a good development of the mycelium but somewhat limit the formation of conidia; (3) those which hinder mycelium growth but very much promote conidia formation; and (4) those which much retard both mycelium and conidia formation. In the 1st group belong maltose, raffinose, and glycerin when used in culture media containing a good nitrogen source. Those substances belonging in the 2nd group are not mentioned by the author. In group 3 belong the acid amids which, even when accompanied by the best of carbon sources, give abundant conidia formation with very slight growth of mycelium. Urea and formanilid are exceptions, however, the former giving relatively abundant production of mycelium and the latter restricting conidia formation and permitting considerable mycelium development. In the 4th group are substances which exert a definite toxic effect. Among nitrogen sources biuret is an example of the substances belonging to this group. The author calls attention to the much greater nutrient value of amino acids than of acid amids, and expresses the opinion that among other factors responsible for this difference is the greater dissociation of the amino acids than of the acid amids.—*R. M. Holman.*

1961. BRENCHLEY, WINIFRED, and VIOLET G. JACKSON. Root development in barley and wheat under different conditions of growth. Ann. Botany 35: 533-556. 4 fig. 1921.—Pot and field experiments on the effect of certain conditions on the root growth of wheat and barley gave these results: (1) In pot culture, barley and wheat made comparable growth; the manured plants, except those receiving sodium nitrate, grew better than the unmanured. (2) In the field, barley responded more readily than wheat to the poorer conditions of soil penetrability and aeration, and the yield was much less. (3) The number of "white" roots

in wheat was the same in manured and unmanured plants; in barley, greater in those manured. The results of different fertilizers on the root: shoot ratio are also given.—*Mildred L. Johnson.*

1962. D[ALLIMORE], W. Effect of removing the pulp from camphor seed on germination and the subsequent growth of the seedlings. [Rev. of: RUSSELL, G. A. (Same title.) Jour. Agric. Res. 17: 223-228. Pl. 20-21, fig. 1-5. 1919 (see Bot. Absts. 3, Entry 2900; also 8, Entry 2187).] Kew Bull. 1920: 45-47. 1920.

1963. LAIBACH, F. Die Bedeutung der Narbe und des Griffels für die Blütenentwicklung von *Origanum vulgare*. [The importance of the stigma and style in the flower development of *Origanum vulgare*.] Ber. Deutsch. Bot. Ges. 38: 43-54. 1920.—The author has studied the effect of pollination and of different degrees of mutilation of the style and stigma upon the dropping of the style and corolla in this species. Considerable shortening of the life of the flowers as a result of pollination took place only when pollen tubes were formed in large quantities. When pollination was scanty, even though sufficient for fertilization of all the ovules, the period before the fall of the corolla and style was only slightly shortened, if at all. The removal of the stigma, or such injuries to the mature stigma as prevented normal functioning, served as a stimulus which brought about the abscission of the corolla and style.—*H. Bergfried.*

1964. MACDOUGAL, D. T. Growth in trees. Carnegie Inst. Washington Publ. 307. 41 p., 16 fig. 1921.—This paper reports recent results obtained in a study of the diameter changes of tree trunks during the growing season. It deals especially with instruments devised by the author for recording and measuring such diameter changes, with a discussion of growth in diameter, and with the enlargement of plant tissues in general. The author's dendrograph has been developed so that it is now an instrument of precision, for making automatic, continuous records of the changes taking place in the diameter of a tree trunk. The changes are adequately magnified by a lever arrangement and the record is traced by a pen on a strip of paper carried by a clock-driven cylinder. A new dendrometer is also described, an inexpensive instrument for reading differences in the circumference of a tree. The readings are shown by a pointer on a dial.—Dendrographic records of 15 species are reported. These represent deciduous dicotyledons and conifers, growing under a wide variety of climatic and seasonal conditions, from the Atlantic to the Pacific, in the U. S. A. The annual period of enlargement is always comparatively brief, being apparently related to temperature and moisture conditions. A slight diurnal fluctuation in trunk diameter was shown for all the trees studied; the diameter was greatest shortly after sunrise and smallest at some time in the afternoon. These daily fluctuations seem to depend upon the relative rates of entrance and loss of water. At the beginning of the growing season, the renewal of activity in the buds frequently begins from 1 to 10 or 12 weeks before the trunk begins to thicken.—The soil about the roots of a Monterey Pine was wetted by irrigation, and progressive trunk enlargement, beginning at the base and extending to a height of 8 m. above, was exhibited within 24 hours of the time when the water was applied. Within this short period the influence of the increased soil moisture traversed a distance of at least 11 m., measuring from the absorbing surfaces of the roots. A California live-oak showed this effect of soil watering within 23 hours, at a distance of 3 m. from the absorbing surfaces.—*B. E. Livingston.*

1965. MOLLIARD, MARIN. Rôle du potassium dans le chimisme et les fonctions reproductive des champignons. [The rôle of potassium in the chemistry and reproductive functions of the fungi.] Compt. Rend. Acad. Sci. Paris. 173: 100-102. 1921.—The appearance of reproductive organs in the fungi and bacteria is found to coincide with the exhaustion of the nutrient solution. In *Sclerigmatocystis nigra* it was found that the propagative structures developed when nitrogen became exhausted in the medium. A nutrient solution with potassium, no monopotassium phosphate, was used. In a complete nutrient solution no reproductive bodies developed. In one low in nitrogen, conidia and perithecia were both produced, whereas, in one low in potassium, neither conidia nor perithecia were formed. It is held that these 2 elements have a specific relation to reproduction.—*C. H. Farr.*

1966. RICOME, H. La croissance curviligne. [Growth in a curved line.] Compt. Rend. Acad. Sci. Paris 173: 595-597. 1921.—Growth in a curved line follows 2 methods: incurvation and decurvation. Both conditions are brought about by the local water content of the growing part concerned.—W. K. Farr.

1967. WELCH, E. S. Reciprocity between scion and root, and discussion. Rept. Iowa Hort. Soc. 54: 264-269. 1919.—The author gives an account of the relation between scion and stock of different fruits.—pear, plum, apple, and apricot.—L. H. Pommel.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1968. BUNER, JOHANNES. Neue phototropische Fundamentalversuche. [New fundamental phototropic experiments.] Ber. Deutsch. Bot. Ges. 38: 10-19. Fig. 1-3. 1920.—This paper relates to the question whether the direction of a phototropic curvature is determined by the direction of the light or by the differences in intensity of illumination within the stimulated organ. After a statement of objections to Heilhronn's and Lundegardh's arguments in favor of the direction hypothesis, the author describes 3 types of experiments which he has carried out and the results of which he interprets as supporting the light-intensity gradient hypothesis. Young sporangiophores of *Phycomyces* growing in water were found to give no phototropic reaction when unilaterally illuminated in the usual manner. This the author assumes to be due to the absence of any considerable difference in the light intensity on the side toward and the side away from the source of light. When a band of light with sharp outline was projected upon a submerged sporangiophore in such a manner as to illuminate the side of the structure toward the light source throughout its length but over only $\frac{1}{2}$ its width, a curvature ensued which was in a plane at right angles to the direction of the light. When *Avena* seedlings were illuminated from above by a narrow shaft of light falling upon $\frac{1}{2}$, or less than $\frac{1}{2}$ of the apex of the coleoptile, curvatures resulted which were in a direction straight angles to the direction of the light, the illuminated side becoming the concave side. Finally the author, by means of a device consisting of a small glass cone drawn out at its apex into a very fine rod bent sharply at its upper end, the whole being silvered except for the base of the cone and the end of the rod, succeeded in illuminating unilaterally and from within the tips of amputated coleoptiles. Thus there was secured a decrease in light intensity in a direction opposite to that of the light rays concerned. The direction of the resulting phototropic reaction was such as would be expected if the light intensity gradient rather than the light direction had determined it.—R. M. Holmon.

1969. RABAUD, ÉTIENNE. Tropismes et tonus musculaire. [Tropisms and muscular tonus.] Compt. Rend. Acad. Sci. Paris 173: 606-608. 1921.—Experiments dealing with the reactions of various insects toward sound and light lead to the conclusion that all the processes producing an effect of orientation in both plants and animals are not of the same nature.—W. K. Farr.

1970. ZAEFFEL, E. L'amidon mobile et le géotropisme. [Mobile starch and geotropism.] Compt. Rend. Acad. Sci. Paris 173: 442-445. 1921.—An osmometer was arranged so that the liquid, consisting of water, starch, diastase, and sugar, in the containing vessel was the same as that in the osmometer. During a certain period the level of the liquid in the osmometer rises, attaining a maximum, and then it progressively falls to the original level. This phenomenon is explained by the settling of the starch grains on the upper side of the membrane and on the bottom of the containing vessel. The action of the diastase results in an increase in the concentration of sugar above the membrane as compared with that immediately below it and hence an osmosis into the osmometer occurs. Later the sugar formed by the action of the diastase upon the starch grains in the bottom of the containing vessel diffused up to the lower side of the membrane and equalized the pressure, resulting in the return of the liquid to its original level. It is held that living starch-containing cells constitute a group of osmometers in dynamic equilibrium. When an organ is changed in orientation with respect to gravity, the falling of the starch grains to the bottom of the cell disturbs this equilibrium and hence a change occurs in turgescence of the cells which results in the geotropic curvature.—W. K. Farr.

GERMINATION, RENEWAL OF ACTIVITY

1971. ANDREWS, F. M. A study of pollen. II. Proc. Indiana Acad. Sci. 1919: 167-168. 1921.—Since the 1st paper in 1917, the pollen of 73 plants has been studied with about the same results as those reported previously. The pollen of *Scabiosa atropurpurea* when placed in distilled water instantly puts out 4 tubes about the length of the diameter of the grain.—*F. C. Anderson.*

1972. ANDREWS, F. M. Studies on pollen. III. Proc. Indiana Acad. Sci. 1920: 155-156. 1921.—This paper raises the list of plants to 540 in which the germination of the pollen has been studied by the author. All the experiments were with percentages of cane sugar ranging from 1 to 60 in distilled water. Of this number the pollen of 5 species produced more than 1 tube, while that of 1 species showed branched tubes.—*F. C. Anderson.*

1973. PRINOSHEIM, ERNST G. Die Auslösung von Zellteilungen bei Pflanzen durch Wundreizstoffe. [The initiation of cell division by wound hormones.] Naturwissenschaften 9: 503-507. 1921.—This is a discussion of recent work of Haberlandt on the subject.—*Orton L. Clark.*

RADIANT ENERGY RELATIONS

1974. SCHANZ, FRITZ. Wirkungen des Lichts verschiedener Wellenlänge auf die Pflanzen. [Action of light of different wave lengths upon plants.] Ber. Deutsch. Bot. Ges. 37: 430-442. Fig. 1-9. 1919.—Plants were grown in beds covered with glass of various kinds that cut out different regions of the spectrum. Eight beds were used, receiving light as follows: (1) without cover, wave lengths λ 300 $\mu\mu$ and longer; (2) covered with ordinary glass, λ 320 $\mu\mu$ and longer; (3) Euphos (a) glass only, λ 380 $\mu\mu$ and longer; (4) Euphos (b) glass only, λ 420 $\mu\mu$ and longer; (5) red glass only, λ 560 $\mu\mu$ and longer; (6) yellow; (7) green; (8) blue violet. By combining yellow, green, and blue violet glass with Euphos, the writer obtained yellow, green, and blue-violet lights, respectively, free from most of the ultra violet rays.—Cucumbers showed a rapid increased growth from beds 1 to 5, that is, corresponding to an increase in wave length. They showed a falling off from beds 5 to 8, this falling off corresponding to diminished wavelength. On the whole, the curve described was similar to a normal frequency curve with the apex or maximum growth in bed 5. Almost all plants used gave a curve the rise of which was similar to the above; all curves, however, did not agree on their downward slope. Blooming took place earlier passing from beds 1 to 4 (Euphos glass cut out ultra violet rays), and fruits likewise increased progressively. In red, yellow, green, and blue violet, blooming was deferred and number of fruits reduced. The development of anthocyanin in red pigmented plants was successively less in beds 1 to 3, and no red pigment developed in beds 4 to 8. Plants grown in beds 4 to 8 and then transferred to bed 1 showed anthocyanin development within 2 days. The author found no evidence that anthocyanin had a protective function against the action of ultra violet rays. When plants were taken from 4, where no red color was developed, to 1 no injury was apparent during the time necessary for the production of red pigment.—The rate of germination of certain seeds increased from 1 to 4. Repeated cultures showed that ultra violet rays interfered with germination. Etiolated seedlings had the following order of greening: red, Euphos (b), Euphos (a), ordinary glass, open bed, yellow, green, blue violet. The development of chlorophyll is favored and its decomposition in old plants is deferred by the removal of ultra violet rays.—*A. R. Davis.*

1975. ZOLLIKOFER, CLARA. Ueber die tropistische Wirkung von rotem Licht auf Dunkelpflanzen von *Avena sativa*. [Tropic action of red light on etiolated plants of *Avena sativa*.] Verslag. K. Akad. Wetenschapp. Amsterdam 29: 551-558. 1 fig. 1920.—Experiments were conducted in a room ("dark room") under the influence of a 100 candlepower light, surrounded by very dark ruby glass which was spectroscopically tested. The room was at a temperature of 22.5°C. and a humidity of 55-60 per cent. All reactions showed a remarkable uniformity at any definite light intensity. The lowest light intensity at which any observable phototropic action occurred was between 15 and 30 meter-candlepower-seconds.—*J. C. Th. Uphof.*

TOXIC AGENTS

1976. DRECRSEL, OTTO. Zur Kenntnis der sog. oligodynamischen Erscheinungen.—Ein Beitrag zur Physiologie der Giftwirkung. [The so-called oligodynamic phenomenon.—A contribution to the physiology of toxic action.] Centralbl. Bakter. II Abt. 53: 288-311. 1921.—Investigations are reported on the toxic action of extremely dilute solutions of a number of dyes, alkaloids, and salts of heavy metals on certain algae (for the most part *Spirogyra*) in which there was taken into consideration the ratio between the weight of the toxic substance and of alga used in the experiment. The results obtained suggest that the toxic effect resulted from the accumulation within the living cell of the injurious substances, which, to exhibit their characteristic action, must reach a certain definite concentration in the cell within a given time. The so-called oligodynamic phenomenon of Nägeli, Rumm, and Geolotti is of course a case of direct chemical effect.—*M. A. Raines.*

1977. MORGAN, G. T., and E. A. COOPER. The bactericidal action of the quinones and allied compounds. Biochem. Jour. 15: 587-594. 1921.—A slow chemical reaction is shown to take place between *p*-benzoquinone and proteins, during which the quinone is gradually removed. Benzoquinone has a bactericidal power 80-190 times as efficient in destroying *Bacillus typhosus* as quinol or phenol. The bactericidal power of the quinones diminishes as the homologous series is ascended. The mechanism of this action is not understood, but it is probably due to the chemical interaction of the nascent peroxide molecules with certain protein constituents of the bacterial protoplasm.—*Grace E. Howard.*

ELECTRICITY AND MECHANICAL FORCES

1978. ANDREWS, F. M. The effect of centrifugal force on plants. Proc. Indiana Acad. Sci. 1920: 143-145. 1921.—Seedlings of *Cucurbita Pepo* with roots 3 cm. long were centrifuged for 2 hours with a force of 4400 gravities. The roots of the plants centrifuged in air grew 2.5 mm. and in water 2.1 mm., while those of the controls grew 3.5 mm. The contents of the cells were thrown to the centrifugal end of the cell, but returned to the normal position after 2 or 3 days. Centrifugal force varying from 2000 to 5000 gravities was used on different seedlings for varying lengths of time—1 hour to 5 days. The results showed that growth was retarded but that the cells were not killed.—*F. C. Anderson.*

PHYSIOLOGY OF DISEASES

1979. WATERHOUSE, W. L. Studies in the physiology of parasitism. VII. Infection of *Berberis vulgaris* by sporidia of *Puccinia graminis*. Ann. Botany 35: 557-564. 1921.—Infection of *Berberis vulgaris* by the sporidia of *Puccinia graminis* is reported to be produced by mechanical pressure. The spore becomes attached to the leaf by the gelatinous sheath of the germ tube; this then puts out a narrow beak which pierces the wall, but has no immediate chemical effect on it or on the cell contents.—*Mildred L. Johnson.*

MISCELLANEOUS

1980. ANDREWS, F. M. Apparatus for aerating plants. Proc. Indiana Acad. Sci. 1919: 165-167. 1921.—Modifications of the Bunsen pump were found useful in aerating water cultures.—*Mildred L. Johnson.*

1981. PALMER, L. S. Plant pigments and camouflage. Sci. Amer. 124: 509. 1921.—This is a communication explaining the method of detecting camouflaged foliage. Natural green foliage viewed through a light filter which transmits green very little and red a great deal, will appear red while green paint which reflects only green light will appear green through such a filter.—*Chas. H. Otis.*

SOIL SCIENCE

J. J. SKINNER, *Editor*F. M. SCHERTZ, *Assistant Editor*

(See in this issue Entries 906, 909, 938, 1729, 1744, 1801, 1836, 1904, 1906, 1948, 1950, 1959)

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*(See also in this issue Entries 1065, 1071, 1137, 1145, 1180, 1197, 1202, 1470, 1474, 1525, 1557,
1583, 1586)

GENERAL

1982. ANONYMOUS. [Rev. of: HAYATA, BUNZO. *Icones Plantarum Formosanarum nec non et contributiones ad floram Formosanum.* (Illustrations of Formosa plants and also contributions to the Formosa flora.) Vol. 10. iv + 335 p. Bureau of Productive Industries, Government of Formosa: Taihoku, 1921.] *Nature* 108: 237. 1921.

1983. CHEESEMAN, T. F. New species of flowering-plants. *Trans. and Proc. New Zealand Inst.* 53: 423-425. 1921.—The following species are described as new and their distribution and affinities are discussed: *Agrostis pallens*, *Atropis chathamica*, *Plantago Masonae*, *Colobanthus strictus*, *C. Hookeri*.—Wm. Randolph Taylor.

1984. CONARD, H. S. Fossil plants and classification. *Amer. Bot.* 27: 95-101. 1921.—This is a statement of the author's reasons for desiring a modified or new system for the classification of plant groups.—S. P. Nichols.

1985. COULTER, J. M. New African plants. [Rev. of: ENGLER, A. *Beiträge zur Flora von Afrika. XLVII.* (Contributions to the flora of Africa.) *Bot. Jahrb.* 55: 350-400. 1919 (see *Bot. Absts.* 7, Entry 517).] *Bot. Gaz.* 69: 360. 1920.

1986. OLIVER, W. R. B. Notes on specimens of New Zealand ferns and flowering-plants. *Trans. and Proc. New Zealand Inst.* 53: 362-365. 1921.—Twelve species are listed and their distribution and synonymy discussed.—Wm. Randolph Taylor.

1987. PETRIE, D. Descriptions of new native flowering-plants, with a few notes. *Trans. and Proc. New Zealand Inst.* 53: 365-371. Pl. 57-58. 1921.—*Notospartium glabrescens*, *Coriaria thymifolia* var. *undulata*, *Epilobium Mattheusii* (replacing *E. arcuatum* Petrie), *Aciphylla Poppelwelli*, *A. Poppelwelli* var. *major*, and *Carex Wallii* are described as new species or varieties.—Wm. Randolph Taylor.

1988. PIRES DE LIMA, AMÉRICO. Subsídios para o estudo da flora de Moçambique. Espermáfitas do litoral-norte. 1^a centúria. [Materials for the study of the Mozambique flora. Spermatophytes of the north coast. 1st century.] *Brotéria Sér. Bot.* 19: 107-143. 1921.—The author collected in the neighborhood of Palma, near Tunque Bay, and at Mocimboa da Praia, and also had material from near the Rovuma River given him. The climate made the preservation of succulent or hydrophytic specimens nearly impossible, but in all over 400 specimens were secured representing some 300 species. The material was named with the assistance of the herbarium and library of Dr. Henriquez at Coimbra. About a score of the

specimens could be named only generically. Further, the list includes a number of cultivated species which have become partly established and form characteristic features of the flora. The soil of the region is largely a sand, usually shallow, underlain by impervious red clay which frequently appears at the surface through work of white ants.—The plant list includes about 100 species, Glumaceae to Solanaceae, with much descriptive matter and full references by number to the author's collections. One new combination is made in *Cracca*, and the following species proposed as new; authority in all cases is P. de Lima: *Gloriosa Sampaiana*, *Loranthus Romualdensis*, *Achyranthes asperoides*, *Pedicellaria glandulosa*, *Baphia mucin-boensis*, *Crotalaria tunguensis*, *Abrus gracilis*, *A tunguensis*, *Hibiscus Henriquesii*.—E. B. Chamberlain.

1989. SMILEY, FRANK JASON. A report upon the boreal flora of the Sierra Nevada of California. Univ. California Publ. Bot. 9: 1-423. Pl. 1-7. 1921.—The author states that this is a working flora for the high Sierra Nevada of California and he has presented a list of all the plants now found there with keys for their determination. He discusses the limits of the territory covered, viz., practically from Tejon Pass at the south, North Fork of the Feather River at the north, and practically all the region between which is above the 6,500-foot contour line. He discusses the petrology, topography, climatology, and life zones of the territory covered, as an introduction to the taxonomic portion. The following new species, varieties, and new combinations are proposed: *Sitanion rigidum* var. *californicum* (J. G. Smith), *Poa Pringlei* var. *Hanseni* (Scribn.), *Scirpus yosemitanus*, *Carex tahoensis*, *Luzula spicata* var. *nova*, *Brodiaea ixioidea* var. *scabra* (Greene), *Calochortus Nuttallii* var. *Leichlinii* (Hook.), *Fritillaria gracillima*, *Eriogonum ursinum* var. *venosum* S. Stokes in Herb., *Cerastium arvense* var. *Sonnei* (Greene), *Delphinium pauciflorum* var. *Sonnei* (Greene), *Arabis Lyallii* var. *Davidsonii* (Greene), *Sedum obtusatum* var. *Hallii* (Britton), *Ribes hirtellum* var. *inerme* (Rydb.), *Pyrus sitchensis* var. *californica* (Greene), *Horkelia purpurascens* var. *pinetorum* (Coville), *Hosackia cuprea* (Greene), *Acer glabrum* var. *Torreyi* (Greene), *Acer glabrum* var. *disfusum* (Greene), *Pentstemon procerus* f. *geniculatus* (Greene), *Mimulus primuloides* var. *pilosellus* (Greene), *Chrysanthemum nevadensis* f. *monocephalus* (A. Nels. and Kennedy), *Chrysanthemum nevadensis* var. *vulcanicus* (Greene), *Erigeron nevadensis* var. *Sonnei* (Greene), *Eriophyllum lanatum* var. *integrifolium* (Hook.), *Arnica mollis* var. *scaberrima* (Greene), *Cirsium Drummondii* var. *acaulescens* (Gray), *Agoseris glauca* var. *laciniata* (Eaton).—W. A. Setchell.

1990. SPRAGUE, T. A. Notes on nomenclature. Jour. Botany 59: 345-349. 1921.—These are notes on "four overlooked generic names" belonging to some of the segregates of *Mesembryanthemum*, followed by a discussion of "the orthography of some generic and specific names."—Adele Lewis Grant.

PTERIDOPHYTES

1991. BUTTERS, FREDERICK K. Taxonomic and geographic studies in North American ferns. III. *Pellaea glabella* and its western segregates. Amer. Fern Jour. 11: 75-82. 1921.—The article is a detailed study of *Pellaea glabella* Mett. ex Kuhn, *P. pumila* Rydb., and *P. Suksdorfiana* Butters in which "the differences between these three closely related species" are pointed out.—F. C. Anderson.

1992. SCHAFFNER, JOHN H. North American species of *Equisetum* north of Mexico. Amer. Fern Jour. 11: 65-75. 1921.—According to the author the species of the genus *Equisetum* are too closely allied to be divided into sub-genera, but may be divided into a number of sections. In this article, the distinguishing characteristics of 5 sections of the genus *Equisetum* are pointed out, and a "Phyletic synopsis of *Equisetum*, North American species north of Mexico" is given. 13 species with type locality, habitat, and range are listed. Varieties, fluctuations, and hybrids are not considered in this paper.—F. C. Anderson.

SPERMATOPHYTES

1993. AMES, O. Additions to the orchid flora of Panama. Proc. Biol. Soc. Washington [D. C.] 34: 149-154. 1921.—The following plants from a collection by Elsworth P. Killip in the provinces of Panama and Chiriquí are described as new species: *Camaridium grandiflorum*, *Erythrodes Killipii*, *Habenaria patentiloba*, *Ornithocephalus lanuginosus*, *Pleurothallis falcatiloba*, *Scaphosepalum longirepens*, *Scaphyglottis laevilabrum*.—J. C. Gilman.

1994. BEAN, W. J. Garden notes on new or rare trees and shrubs. Kew Bull. 1920: 119-124. 1920.—Notes are given on the following species: *Cladrastis Wilsonii* Takeda, *Magnolia conspicua* var. *purpurascens* Maxim. (*M. denudata* var. *purpurascens* Rehd. & Wils.), *M. Dawsoniana* Rehd. & Wils., *M. Nicholsoniana* Rehd. & Wils., *M. Sargentiana* Rehd. & Wils., *M. Wilsonii* Rehd., *Quercus alnifolia* Poech., *Q. cleistocarpa* Seemen, *Rhododendron hippophaeoides* Balfour f. & Smith, and *Smilax megalantha* Wright.—E. Mead Wilcox.

1995. BORNMÜLLER, J. Über ein neues Alyssum der Flora Syriens und Bemerkungen über einige andere annuelle Arten der Sektion Eu-Alyssum. [A new Alyssum in the flora of Syria and some remarks concerning some other annuals of the Eu-Alyssum section.] Beih. Bot. Centralbl. II Abt. 38: 478-481. 1921.—*Alyssum pyramidatum* is described as a new species.—L. Pace.

1996. BORNMÜLLER, J. Was ist *Vincentoxicum Haussknechtii* M. Schulze? [What is *V. Haussknechtii* M. Schulze?] Beih. Bot. Centralbl. II Abt. 38: 474-477. 1921.—It was supposed that certain plants in the botanical garden at Jena (in the eighties of the last century) were hybrids from *Vincentoxicum fuscum* × *V. officinale*. It is thought that M. Schulze sent examples of the supposed hybrid to Haussknecht for his opinion and then laid them aside with the name *V. Haussknechtii*. No description of it has been found. Now a similar form has been found at Weimar and in looking over the Haussknecht Herbarium it is found with the date Aug. 3, 1883, and listed as a bybrid. However it is not a hybrid. It has preserved its identity for almost half a century. If it is concluded that it is a real variety it should be *V. officinale* Mnch. var. *Haussknechtii* (M. Schulz.) Bornm.—L. Pace.

1997. BORNMÜLLER, J. Zur Gattung *Centaurea*. [On the genus *Centaurea*.] Beih. Bot. Centralbl. II Abt. 38: 458-465. 1921.—Two new species, *Centaurea leucomalla* Bornm. (Sect. *Phalolepidis*) and *C. campylacma* Bornm. (Sect. *Acrolophus*), and a new bybrid, *C. dealbata* × *mucronifer*, are described and other species are discussed.—L. Pace.

1998. BUSCALIONI, LUIGI, e GIUSEPPE MUSCATELLO. Studio monografico sulle specie americane del gen. "Sauraia" Willd. [Monograph of American species of the genus *Sauraia* Willd.] Malpighia 29: 97-112. 1921.—The article deals with a single species, *Sauraia leucocarpa* Schlecht.—Edith K. Cash.

1999. CRATTY, R. I. The genus *Lactuca* in Iowa. Proc. Iowa Acad. Sci. 26: 239-248. 1919.—The author recognizes in Iowa, *L. virosa* L., *L. scariola* L., *L. canadensis* L., *L. sagittifolia* Ell., *L. ludoviciana* (Nutt.) DC., *L. pulchella* (Pursh) DC., *L. villosa* Jacq., *L. spicata* (Lam.) Hitch. A key to the species is given, and figures of the akenes of each.—H. S. Conard.

2000. DRUMMOND, J. R., and J. HUTCHINSON. A revision of *Isopyrum* (Ranunculaceae) and its nearer allies. Kew Bull. 1920: 145-169. Illus. 1920.—*Asteropyrum* and *Paraquilegia* are described as new genera. The following new species are described: *Asteropyrum Cavaleriei*, *A. peltatum*, *Paraquilegia caespitosa*, *P. grandiflora*, *P. microphylla*, *P. uniflora*, and *Isopyrum Dalzielii*. The following new combinations are published: *Enemion Hallii*, *E. occidentale*, *E. stipitatum*, *Semiaquilegia Eastwoodiae*, *S. Henryi*, and *S. simulatrix*.—E. Mead Wilcox.

2001. ENGLER, A. Eine neue Saxifraga der Sektion Kabschia aus Yunnan. [A new saxifrage of the section *Kabschia* from Yunnan.] Notizbl. Bot. Gart. Berlin 7: 540, 541. 1921.—*S. Schneideri* n. sp. is described.—H. A. Gleason.

2002. ENSIGN, E. *Rosa pratincola* Greene. Proc. Iowa Acad. Sci. 26: 303-310. 1919.—The author gives a minute and extensive description of the common low wild rose of the Iowa prairie, identifying it as *R. pratincola* Greene rather than *R. blanda* or *R. arkansana*.—H. S. Conard.

2003. GILG, ERNST. Eine neue, prachtvoll blühende Gentiana-Art (*Gentiana regina*) aus Peru. [A new showy-flowered gentian (*Gentiana regina*) from Peru.] Notizbl. Bot. Gart. Berlin 7: 509-511. 1921.

2004. GODFERY, M. J. *Orchis elodes* Grisebach. Jour. Botany 59: 305-308. 1921.—The author gives his reasons for believing that *O. elodes* Griseb. is the same as the plant later described by Linton as *O. ericetorum* and by Webster as *O. maculata* var. *praecox*. He also discusses in detail the question of whether *O. elodes* should be considered as a distinct species or as *O. maculata* var. *elodes*.—Adele Lewis Grant.

2005. GUÉRAUD, MME. MARCELLE. Sur le rétablissement du genre *Chlorocrepis* dans la tribu de Composées-Chicoracées. [On the reestablishment of the genus *Chlorocrepis* in the tribe Chicoraceae of the Compositae.] Compt. Rend. Acad. Sci. Paris 173: 724-726. 1921.—This genus was established by Grisebach in 1852 for one species, *C. staticefolia*, which was later included in the genus *Hieracium*. On the basis of the histology of the root, rhizome, and stem it now seems that it should be again placed in a distinct genus.—C. H. Farr.

2006. HARMS, H. Eine neue Cucurbitacee aus Peru. [A new cucurbit from Peru.] Notizbl. Bot. Gart. Berlin 7: 502. 1921.—*Gurania Weberbaueri* n. sp. is described.—H. A. Gleason.

2007. HARMS, H. Eine neue Gattung der Leguminosae-Caesalpinoideae aus Argentina. [A new genus of Leguminosae-Caesalpinoideae from Argentina.] Notizbl. Bot. Gart. Berlin 7: 500-501. 1921.—*Stenodrepanum Bergii* n. g. and n. sp. is described.—H. A. Gleason.

2008. HUTCHINSON, J., and K. PEARCE. Revision of the genus *Tryphostemma*. Kew Bull. 1921: 257-266. 1921.—A discussion of this African genus of Passifloraceae is given, together with a key to the 25 species. The following new species are described: *Tryphostemma Snoudenii*, *T. sagittatum*, *T. polygaloides*, *T. viride*, and *T. Grossweileri* all by Hutchinson and Pearce; also *T. reticulatum* Baker.—E. Mead Wilcox.

2009. LINDAU, G. Eine epiphytische Acanthacee, *Dischistocalyx epiphytica* Lindau nov. spec. [A new epiphytic Acanthad.] Notizbl. Bot. Gart. Berlin 7: 494. 1921.

2010. MILDRAED, J. *Neozenkerina* Mildbr. nov. gen. Notizbl. Bot. Gart. Berlin 7: 491-493. 1921.—*N. bicolor* is described as new. The genus is placed in the Scrophulariaceae, but is regarded as an old type connecting that family with the Acanthaceae.—H. A. Gleason.

2011. MILDRAED, J. Zur Kenntnis der afrikanischen Sterculiaceae-Mansonieae. [On the African members of the tribe Mansonieae, family Sterculiaceae.] Notizbl. Bot. Gart. Berlin 7: 486-490. 1921.—Critical notes on 2 species are presented, and *Mansonia nymphaeifolia* is described as new.—H. A. Gleason.

2012. MOTTIER, DAVID M. *Hydrangea arborescens* var. *sterilis* Torr. and Gray as an ornamental plant. Proc. Indiana Acad. Sci. 1919: 59-62. Fig. 1-2. 1921.—The author has made a study of *Hydrangea arborescens* var. *sterilis*, a very ornamental plant, with special reference to its origin. This plant "originated in nature from the fertile species probably as a seed mutant or bud sport." The *Hydrangea grandiflora* of the florist may be cultivated specimens of var. *sterilis*.—F. C. Anderson.

2013. PARKER, R. N. N. W. Himalayan Astragalus of the subgenus Aegacantha. Kew Bull. 1921: 266-270. 1921.—Taxonomic and ecologic notes are presented.—E. Mead Wilcox.

2014. PENNELL, FRANCIS W. Scrophulariaceae of Colombia I. Proc. Acad. Nat. Sci. Philadelphia 72: 136-188. 1920.—The work is based largely upon the writer's own collections made during a 9-months stay in Colombia but all other known collections in the U. S. A. were examined. Keys are given for the "Antirrhinoid Scrophulariaceae." They are divided into 7 tribes, 23 genera, and 50 species. The following new genera, new species, new varieties, and new combinations are made: *Caconapea auriculata* (Roh.) comb. nov., *C. debilis* sp. nov., *C. axillaris* (Benth.) comb. nov., *C. appressa* sp. nov., *C. conferta* sp. nov., *Gratiola bogotensis* Cortés sp. nov., *Monocardia* gen. nov., *M. violacea* sp. nov., *M. lilacina* sp. nov., *M. humilis* sp. nov., *M. albida* sp. nov., *Macuillamia limosa* sp. nov., *Uananea* (Ruiz & Pavon) gen. nov., *U. dentata* (Minod) comb. nov., *Lendermia angulata* (Oerst.) comb. nov., *Torenia Thouarsii* n. var. nov., *Alonsoa serrata* sp. nov., *Fagelia microbefaria* (Kranzl.) comb. nov., *F. fruticosa* sp. nov., *F. Lehmanniana* (Kräztl.) comb. nov., *F. bogotensis* sp. nov., *F. alata* sp. nov., *F. nevadensis* sp. nov., *F. tolimensis* sp. nov., *F. micrantha* sp. nov., *F. radiculoides* sp. nov., *F. crenatiloba* sp. nov., *F. scalaris* sp. nov., *F. pinnatisecta* sp. nov., *Russelia colombiana* sp. nov. New species and those seen by the writer are carefully described. In addition to the taxonomic work studies were made of the relation of the species to the vegetative zones.—L. B. Walker.

2015. PILGER, R. Eine neue Ipomoea aus Kamerun. [A new Ipomoea from Kamerun.] Notizbl. Bot. Gart. Berlin 7: 542. 1921.—*Ipomoea Tessmannii* n. sp., is described.—H. A. Gleason.

2016. RYMBERG, P. A. Two new species from Arizona. Amer. Bot. 27: 61-63. 1921.—Descriptions are given of *Eriogonum Clutei* Rydberg n. sp. and *Forestiera arizonica* Rydberg n. comb. (*F. neomexicana* var. *arizonica* Gray).—S. P. Nichols.

2017. ST. JOHN, HAROLD. A critical revision of *Hydrangea arboreascens*. Rhodora 23: 203-208. 1921.—The author has revised this species so as to recognize the various forms represented by the conspicuously different plants which are usually treated as *H. arboreascens* L. by present day authors. He proposes, in addition to the typical *H. arboreascens*, the following forms and varieties: *H. arboreascens* L. f. *grandiflora* Rehder, *H. arboreascens* L. var. *oblonga* T. & G., *H. arboreascens* L. var. *oblonga* T. & G. f. *sterilis* (T. & G.) comb. nov., *H. arboreascens* L. var. *Deamii* var. nov., *H. arboreascens* L. var. *Deamii* St. John f. *acarpa* forma nova. A key is worked out and the bibliography, description, and distribution are given for each variety and form.—James P. Poole.

2018. SMALL, JOHN K. Old trails and new discoveries. Jour. New York Bot. Gard. 22: 25-40, 49-61, Pl. 253-256. 1921.—An account of field observations on the flora of peninsular Florida is given, with a description of *Diospyros Mosieri* n. sp.—H. A. Gleason.

2019. SMALL, JOHN K. Seminole bread—the conti. Jour. New York Bot. Gard. 22: 121-137. Pl. 258-259. 1921.—The article includes a botanical history of the Florida species of *Zamia*, a discussion of their taxonomy and distribution, and a description of *Z. umbrosa* n. sp. J. H. BARNHAERT supplies biographical footnotes on William Bartram, William Baldwin, Alexander Garden, John Ellis, John Bartram, William Aiton, Alphonse de Candolle, Asa Gray, Augustin de Candolle, M. C. Leavenworth, B. R. Alden, John Torrey, and G. W. Hulse.—H. A. Gleason.

2020. SPRAGUE, T. A. A revision of the genus *Belotia*. Kew Bull. 1921: 270-278. 1921.—In this Central American genus of Tiliaceae 11 species are recognized and a key for their identification is provided. The following new species are described: *Boletia Campbellii*, *B. caribaea*, *B. grandifolia*, *B. macrantha*, *B. reticulata*, and *B. tabascana*. *Heliocarpus mexicanus* (Turcz.) Sprague is published as a new combination.—E. Mead Wilcox.

2021. URBAN, IGN. Über die Malvaceen-Gattung *Montezuma* Moc. et Sesse. [On the genus *Montezuma* Moc. & Sesse.] Notizbl. Bot. Gart. Berlin 7: 543, 544. 1921.—The genus was described from Mexico, but has not since been collected there. The author confirms Standley's opinion that the locality was given erroneously and identifies the genus with *Maga* from Porto Rico. The latter name must give way to *Montezuma* on priority.—H. A. Gleason.

2022. WILLIAMS, FREDERICK N. Critical notes on some species of *Cerastium*. Jour. Bot. 59: 324-329, 349-353. 1921.—This is a continuation of an article in Jour. Bot. 37: 47. 1899, and consists of extensive notes on species of *Cerastium*, arranged in an alphabetical series from *C. furcatum* to *C. Hochstetterianum*. *C. glutinosum* β *glabratum* from the Andes of Colombia is described as a new variety and *C. nepalense* Wall. is reduced to a variety as *C. glomeratum* var. *nepalense*. It has been impossible to decide whether the following list of varieties and combinations is published here for the first time: *C. gibraltaricum* α *viridis*, *C. gibraltaricum* β *niveo-tomentosum*, *C. gibraltaricum* γ *lanuginosum*, *C. grandiflorum* f. *typicum*, *C. grandiflorum* f. *leiostemon*, *C. grandiflorum* f. *leiosistem*, *C. grandiflorum* f. *leiozymum*, *C. grandiflorum* f. *glabrescens*, *C. hirtellum* var. *echinulatum*.—K. M. Wiegand.

2023. YUNCKER, T. G. Notes on our Indiana dodders. Proc. Indiana Acad. Sci. 1919: 157-163. Fig. 1-4. 1921.—The article contains a key for the identification of the species of *Cuscuta* found in Indiana together with notes on the 9 species found in the state, of which 7 are native and 2 introduced. One native species, *C. pentagona*, and the 2 introduced species, *C. Epithymum* and *C. Epilinum*, are harmful to crops.—F. C. Anderson.

MISCELLANEOUS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

2024. ANONYMOUS. Achtzehnte Hauptversammlung des Vereins deutscher Nahrungsmittelchemiker zu Eisenach am 27 und 28 September 1920. [Proceedings of the Society of German Food Chemists at Eisenach, September 27 and 28, 1920.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 296-363. 1921.—Register, minutes, and original papers, which are abstracted or cited elsewhere, are given.—E. E. Stanford.

2025. ANONYMOUS. Additions to the herbarium during 1919. Kew Bull. 1920: 43-45. 1920.

2026. ANONYMOUS. Additions to the herbarium during 1920. Kew Bull. 1920: 45-48. 1920.

2027. ANONYMOUS. Gesetze und Verordnungen sowie Gerichtsentscheidungen, betr. Nahrungs- und Genussmittel und Gebrauchsgegenstände, Januar-Februar 1921. [Statutes, ordinances, and notices of judgment concerning foods, drugs, condiments, chemicals, technical products, and similar commodities, January-February, 1921.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel (Supplement) 41: 1-16. 1921.

2028. ANONYMOUS. Gesetze und Verordnungen sowie Gerichtsentscheidungen, betr. Nahrungs- und Genussmittel und Gebrauchsgegenstände, März 1921. [Statutes, ordinances, and notices of judgment concerning foods, drugs, condiments, chemicals, technical products, and similar commodities, March, 1921.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel (Supplement) 41: 17-44. 1921.

2029. ANONYMOUS. *Gesetze und Verordnungen sowie Gerichtsentscheidungen, betr. Nahrungs- und Genussmittel und Gebrauchsgegenstände, April 1921.* [Statutes, ordinances, and notices of judgment concerning foods, drugs, condiments, chemicals, technical products, and similar commodities, April, 1921.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* (Supplement) 41: 45-60. 1921.

2030. ANONYMOUS. *Gesetze und Verordnungen sowie Gerichtsentscheidungen, betr. Nahrungs- und Genussmittel und Gebrauchsgegenstände, Mai 1921.* [Statutes, ordinances, and notices of judgment concerning foods, drugs, condiments, chemicals, technical products, and similar commodities, May, 1921.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* (Supplement) 41: 61-76. 1921.—This includes an index of official institutions investigating these products in Germany.—*E. E. Stanford*.

2031. ANONYMOUS. *Miss M. L. Moxon's alpine flower studies.* *Kew Bull.* 1920: 371-372. 1920.—Notes are given on a collection of about 1,000 water-color drawings of the wild flowers of Switzerland.—*E. Mead Wilcox*.

2032. ANONYMOUS. *Research in Jodrell laboratory in 1919.* *Kew Bull.* 1920: 39. 1920.

2033. ANONYMOUS. *Research in Jodrell laboratory in 1920.* *Kew Bull.* 1921: 41. 1921.

2034. ANONYMOUS. *Siebzehnte Hauptversammlung des Vereins deutscher Nahrungsmittelchemiker, zu Eisenach am 18 Oktober 1919.* [Proceedings of the Society of German Food Chemists at Eisenach, October 18, 1919.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 241-295. 1921.—Register and minutes of the meeting are given; also original papers, which are abstracted or cited elsewhere.—*E. E. Stanford*.

2035. ANONYMOUS. *The German vegetable-fiber industry.* *Chem. and Metallurgical Eng.* 23: 1208. 1920.—This is an account of a German industry established in 1912 for the manufacture of yarn from grasses, plants, leaves, etc. Among materials used are: China grass, Australian seaweed, jute, old jute rags, shoddy worsted yarn, nettles, hops, willow bark, pine needles, cornstalks, ginster, and asparagus. China grass yields a fiber called solidonia, and Australian seaweed one called posidonia. Jute is treated chemically to produce another fiber, and thoroughly cleaned old jute rags are converted into shoddy.—*Mary R. Bur*.

2036. ANONYMOUS. *The Imperial Bureau of Mycology.* *Kew Bull.* 1921: 94-95. 1921.

2037. ALLEN, W. E. *A brief study of the range of error in micro-enumeration.* *Trans. Amer. Microsc. Soc.* 40: 14-25. 6 pl. 1921.—Most workers making micro-enumerations make no great effort to determine the accuracy of their counts. The catch from which a sample is taken for counting should be thoroughly mixed, and the sample should be spread uniformly on the slide. From a series of tests in making plankton counts the author draws the following provisional conclusions: (1) By very great care the extreme deviation (in total numbers of diatoms and dinoflagellates) can probably be kept within 25 per cent; (2) the mean deviation can easily be kept within 10 per cent; (3) diatoms are more variable in the count than dinoflagellates; (4) the causes of variability are to be found in mixing, sampling, and spreading on the slide, rather than in the counting; (5) the range of error in counting is at most far less for microplankton material than that in locating, catching, and preserving material.—*S. H. Essary*.

2038. AREY, MELVIN F. *County parks.* *Rept. Iowa State Bd. Conservation* 1919: 290-92. 1919.—The author advocates county parks to combine the features of national and city parks, and suggests that these parks should be used as arboretums.—*L. H. Pammel*.

2039. BEHRE, A. Nahrungsmittel-Gesetzabgebung und-Kontrolle während der Kriegszeit. [War-time food regulation and control.] Zeitschr. Nahrungs- u. Genussmittel 41: 244-259. 1921.—This detailed review, dealing especially with war-time substitutes, includes a bibliography of the principal legislation.—*E. E. Stanford.*

2040. BEYTHIEN, A. Ersatzmittelverordnung oder Nahrungsmittelgesetz? [Substitute regulations versus foodstuff laws.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 336-344. 1921.

2041. BEYTHIEN, A. Über Kunsthonig. Bericht über die Beratung der vom Verein deutscher Nahrungsmittelchemiker ernannten Kommission mit Vertretern der Industrie, [Artificial honey. Report of a commission named by the Society of German Food Chemists with representatives of the industry.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 300-308. 1921.—The commission decided that "Kunsthonig" (artificial honey) is a proper term for the product, which should be made solely from inversion of pure cane or beet sugar, and must possess a honey-like aroma. Coloring is permissible. Acids used in inversion must be chemically pure. Potassium compounds must not be used for neutralization of acid. Artificial honey must contain not less than 78 per cent of solids and not over 10 per cent of unchanged sugar. Other regulations for its manufacture and sale are proposed.—*E. E. Stanford.*

2042. BULLARD, CHARLES. A method of orienting and mounting microscopic objects in glycerine. Trans. Amer. Microsc. Soc. 40: 89-93. 1921.—A slide is prepared by placing a minute smear or a few small drops of weak glycerine jelly within a previously prepared and well seasoned ring of Brunswick Black on a slide. The material to be mounted is spread out in glycerin on a slide and examined under a microscope, and the objects to be mounted are picked out and transferred to the ring with a fine needle, or with a bristle (whisker of a dog or cat) mounted on a needle. The objects are oriented and arranged within the ring under the low power of a compound microscope. While the objects are being arranged the weak jelly is kept liquid by breathing upon it, and it is then hardened by chilling. The weak jelly is prepared by melting a few drops of glycerin jelly in a small vial and reducing the jelly with distilled water until it will just set at room temperature. After the objects are in position in the ring and the jelly has been hardened by cold, a drop of glycerin is placed upon the mount, and a cover, supported by a bit of a crushed cover glass or a small ball of fibers from a blotter, is put in position. Care should be taken to add just sufficient glycerin to fill the cell, and to remove all excess glycerin from the slide with alcohol before sealing. The slide is sealed with King's Cement, several rings being applied one over the other. Sealing is finished with 2 coats of Brunswick Black. Mounts thus prepared keep for years, if handled carefully and kept horizontal. This method is used in Professor Thaxter's laboratory (Harvard University) for mounting the lower fungi and other more delicate thallophytes, and is especially adapted for mounting desmids.—*S. H. Essary.*

2043. CLUTE, W. N. The Victoria water lily. Amer. Bot. 27: 81-86. 1921.—This is an account of the leaf and its peculiarities.—*S. P. Nichols.*

2044. CONARD, HENRY S. Relation of the community to the preservation of wild plants. Rept. Iowa State Bd. Conservation 1919: 224-229. 1919.—In this general discussion of the subject special mention is made of *Helenium*, *Helianthus*, and *Pyrus coronaria*.—*L. H. Panam.*

2045. DAVIDSON, J. The morality of plants. British Columbia Monthly 17: 13-15; 17: 5-10. 1921.—A non-technical discussion of plants in which stems do the work of leaves and in which stems depend upon others for support. The question of the development and habits of parasites is also discussed. Most of the examples are taken from the flora of British Columbia.—*Geo. D. Fuller.*

2046. GAGE, SIMON H. Special oil-immersion objectives for dark-field microscopy. *Science* 54: 567-569. 1921.—The Bausch and Lomb Optical Co. is manufacturing a medium-aperture (0.80 N.A.), oil-immersion objective of which the writer explains the advantage for dark-field work, and the use for studying body fluids and microorganisms.—*C. J. Lyon.*

2047. HAAS, PAUL, and T. G. HILL. On carrageen—*Chondrus crispus*. *Ann. Appl. Biol.* 7: 352-362. 5 figs. 1921.—In this report of their study of carrageen as a substitute for gelatin, the authors describe methods of preparation of carrageen and its properties and uses.—*C. R. Hursh.*

2048. HANAK, A. Bestimmung des Volumens des wasserunlöslichen Teiles von Marmaladen, Gemüsen, Früchten, Schokolade, usw. [Estimation of the volume of insoluble matter in marmalades, vegetables, fruits, and chocolate.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 179-180. 1921.—The author describes a pycnometer method which is said to give good results if carried out with extreme care.—*E. E. Stanford.*

2049. HANNIG. Gemeinsame Versammlung der Deutschen Botanischen Gesellschaft, der Freie Vereinigung der systematischen Botaniker und Pflanzengeographen und der Vereinigung für angewandte Botanik. [Joint convention of the German Botanical Society, the Association of Systematic Botanists and Plant Geographers, and the Association of Applied Botany.] *Zeitschr. Forst- u. Jagdw.* 51: 613-617. 1919.—A brief account is given of the convention and papers read. The more important papers deal with the occurrence of organic substances in dying leaves; age indications in deciduous leaves; the bios problem in yeast investigations; the viability, life period, and indicators of age in a plasmodium; the present status of the carbonic acid question in plant culture; symptoms by which smoke damage may be recognized (injury to the lenticels and sinking of the tissue surrounding the lenticels); the phytogeographical importance of the mountain flora of New Guinea; and notes on the phylogenetical development of inflorescences.—*J. Roess.*

2050. HEIDE, C. VON DER, und W. LOHMANN. Nachweis des Saccharins im Wein. [Demonstration of saccharin in wine.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 230-236. 1921.—By changes described the official (German) method is said to be improved, in that the removal of benzoic acid is unnecessary and the use of ether is diminished.—*E. E. Stanford.*

2051. HOARE, CECIL A. Scientific publication. *Nature* 108: 179. 1921.—The author discusses the suggestion that publication of details be eliminated as undesirable and urges government subsidy.—*O. A. Stevens.*

2052. JOHNSON, D. S. The Cinchona station. *Bot. Gaz.* 69: 347-348. 1920.—This is a note stating that the Smithsonian Institution has renewed the lease of the Cinchona Station in Jamaica and calling attention to the great opportunities for research afforded there.—*H. C. Cowles.*

2053. JUCKENACK, A. Empfiehlt es sich, auf Grund der in dem Nahrungsmitteluntersuchungsintern bisher gesammelten Erfahrungen die Ersatzmittelgesetzgebung ab- oder weiter auszubauen? [From the results of official food investigations, shall food substitute regulations be abolished or extended?] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 280-285. 1921.

2054. JUCKENACK, A. Zur Reform der Lebensmittel-Gesetzgebung. [On reform of food regulations.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 41: 322-336. 1921.

2055. KAHN, MORTON CHARLES. Microscopical trouble-makers in the water supply. *Natural History* 20: 83-90. Pl. 9. 1920.—Algae found in water supplies are described, and those producing disagreeable results, e.g., diatoms, desmids, *Videx*, and the usual filamentous forms, as well as *Glenodium*, *Peridinium*, and *Uroglena*, are noted. Attention is called to the

fact that pathogenic bacteria produce no unfavorable flavor and so may be tolerated in water until they become a serious menace. Treatment with copper sulphate is described.—*Albert R. Sweetser.*

2056. KRAUS, ERNST JOSEF. Annähernde Bestimmung von Sesamöl enthaltener Margarine in Butter mit Hilfe der Baudouin'schen Reaktion. [Approximate estimation of margarine containing sesame oil in butter by means of the Baudouin reaction.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 178-179. 1921.—The method is useful only when butter is adulterated with margarine of a known content of oil of sesame [*Sesame indicum* L.].—*E. E. Stanford.*

2057. LEACHMAN, J. D. Indian uses of kelp. Sci. Amer. Monthly 3: 137-140. 4 fig. 1921.—This is an account of the former use by Indian tribes of the North Pacific Coast of such plants as *Macrocystis pyrifera*, *Nereocystis luetkeana*, *Pelagophycus porra*, *Porphyra laciniata*, *Rhodymenia palmata*, and *Ulva latissima*.—*Chas. H. Otis.*

2058. McGOWAN, G. The bacterial purification of trade wastes. Jour. Soc. Chem. Indust. 40: 148T-149T. 1921.—This is the summation of the ninth report of the Royal Commission on Sewage Disposal. A study was made of the bacterial oxidation of trade wastes. The following industries were covered: brewing, distilling, cloth printing and bleaching, paper, tanning, and jam. One unit section of bacterial filter will purify 1 unit volume of waste distillery liquors or $\frac{1}{3}$ volume of waste liquor from calico printing and dyeing.—*G. E. Ray.*

2059. MORGENTERN, F. VON. Ursachen der Durchrostung von Konservendosen aus Weissblech. [Causes of rusting in tin preserve-cans.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 41: 175-178. 1921.—Electrolytic phenomena may dissolve iron containing carbon, and the dissolved iron, forming insoluble compounds with nitrogenous plant materials, thus prevents further damage or spoilage of contents. If this protective layer fails to form, large holes may appear in the tin, and the contents spoil. Protection from rust is contingent on the use of carbon-free iron.—*E. E. Stanford.*

2060. MOUNT, H. A. The oil that makes the wheels go 'round. Sci. Amer. 125: II 1921.—Animal and vegetable lubricants are compared with those of mineral origin, today and in the future.—*Chas. H. Otis.*

2061. MURRILL, W. A. Cacti and their uses. Sci. Amer. 124: 492, 499-500. 5 fig. 1921.

2062. OSBORN, HENRY FAIRFIELD. Sequoia,—the auld lang syne of trees. Natural History 19: 613. 9 illus. 1919.—An account is given of the Save the Redwoods League, its purpose and personnel, and an appeal is made to preserve the vanishing redwoods.—*Albert R. Sweetser.*

2063. TURRENTINE, J. W., and P. S. SHOAFF. Potash from kelp, IV. Continuous counter current lixiviation of charred kelp. Jour. Indust. and Eng. Chem. 13: 605-609. 1913.

2064. WESTERMEIER, KURT. Über den Wert des Ostwaldschen Farbenatlases bei Blattfarbbestimmungen und Vorschläge zu dessen Ausbau. [Concerning the value of the Ostwald color maps for leaf color determinations and suggestions for their extension.] Beih. Bot. Centralbl. 38: 266-272. 3 fig. 1921.—Various hues and shades may be separated and worked out schematically on the cards so that very slight differences can be quickly and correctly recognized.—*L. Pace.*

2065. WINTERS, S. R. Molasses for fuel. Sci. Amer. 124: 427, 437, 439. 1 fig. 1921.

